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The Editor will be glad to receive publications relating to Veterinary Science and cognate subjects in order that they may be dealt with in the *Veterinary Bulletin.*

Reports of Departments, Special Reports, reprints, etc., etc., should be sent as soon as they are issued.

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DISEASES CAUSED BY BACTERIA AND FUNGI

—. (1944). **Modes of spread of Streptococcus agalactiae infection in dairy herds. A report on co-ordinated observations organised by the Agricultural Research Council of the United Kingdom.**—*Rev. Ser. Imp. Bur. Anim. Hlth, Weybridge.* No. 2. pp. 27. [4to] [3s.] **1372**

Observations on about 908 cattle in 20 herds at five different centres are described which indicate the routes by which *Str. agalactiae* infection spreads and some of the causes of its persistence in dairy herds. A standard method of sampling was adopted. One worker washed the teats and lower part of the udder of each cow with a sterile cloth. The udder was allowed to dry and the teats were then swabbed by a second worker, wearing sterile rubber gloves. A third worker similarly attired then obtained a milk sample from each quarter. Examination of swabs and samples was subsequently undertaken at the laboratory by culture and by precipitin test.

Results showed that if milk samples and teat swabs are examined at weekly intervals from all animals in a herd, the proportion of animals found to harbour *Str. agalactiae* rises rapidly and may ultimately reach 100%. In nine dairy herds sampled at weekly intervals for periods of 2½–6 months, the proportion of cows yielding *Str. agalactiae* in the milk at one time or another varied from 35·6–100%. Similarly, the proportion of cows showing teat infection was 45·7–100%.

Of 16,482 samples of milk from 20 herds, *Str. agalactiae* was isolated from 38·8%, and of 5,433 teat swabs from nine of these herds, 23·1% were infected.

Repeated examinations showed that a proportion of cows from whose teats *Str. agalactiae* had been isolated were persistent skin carriers of *Str. agalactiae.* In these animals the milk was often not infected, but there were frequently abrasions and sores on the teats. Cases were encountered, however, of massive skin infection unassociated with any skin lesions or infection of the milk.

Tests confirmed that *Str. agalactiae* infection often persists in the dry udder. It was also found that teat infection may persist during the dry period.

Examination of the teats of 23 young heifer calves and 27 in-calf heifers on several hundred occasions failed, except in two cases regarded as probable errors, to reveal *Str. agalactiae.* Eleven swabs were also examined from the throat or nostrils of eight calves and 29 swabs from the vaginae of cows. None revealed the organism. Examination of milkers' hands and of dairy utensils, however, showed a high proportion of contamination with *Str. agalactiae.*

Although it was no part of the investigation to reopen the question of the role of *Str. agalactiae* in the causation of bovine mastitis, figures are given showing the correlation between the presence of the organism in the milk or on the teats and clinically obvious mastitis. Of 1,977 samples of milk yielding *Str. agalactiae,* 283 (14·3%) were associated with clinical mastitis. Of 3,460 samples not yielding the organisms, only 129 (3·7%) were similarly associated. The difference is mathematically significant. Of 1,257 positive teat swabs, 139 (11·1%) were associated with clinical disease, while of 4,176 negative swabs, 270 (6·7%) were similarly associated. The difference again is mathematically significant.

It is concluded that the main reservoir of *Str. agalactiae* is in or on the bovine udder and that if infection from this source could be eliminated, *Str. agalactiae* mastitis might be effectively controlled. Recent advances in chemotherapy, including the production of many new skin disinfectants, combined with the greatly increased knowledge regarding the control of infection and reinfection of wounds and burns in man appear to offer an alternative to the methods of bacteriological examination and segregation at present practised. Further work in this direction is now proceeding.—D. D. OGILVIE.

*GEURDEN, L. M. G. (1942). **[Recent advances on streptococci].**—*Vlaam. Diergeneesk. Tijdschr.* **11.** 144–153. [Abst. from abst. in *Wien. tierärztl. Mschr.* **30.** 147–148. (1943)]. **1373**

A short history of the discovery of the streptococci and the attempts which have been made to differentiate between them. Earlier classifications have been based on haemolysis, growth on so-called chocolate-agar and serological differences. A more exact distinction can now be derived from consideration of the biochemical reactions.—S. M. G.

MURPHY, J. M., UDALL, D. H., JOHNSON, S. D., & TOMPKINS, L. J. (1944). **Physical examination of the udder in the diagnosis of chronic bovine mastitis.** —*Cornell Vet.* **34.** 1–12. **1374**

The authors deal with the system of clinical examination for mastitis advocated by Udall and discuss the subject under three heads :– (a) "the palpable physical condition of udders known to be free of infection during the first lactation period", (b) "a direct comparison of the results of physical examination with the results of the examination of the secretion for streptococcal infection" and (c) "consideration of the physical examination status and accumulated evidence of infection and mastitis in terms of single cows for whole lactation periods". Udders of about 120 cows free from brucellosis and TB. in a

self-contained herd were placed in classes named 1, 2, 3, or 4 on the basis of these examinations, class 1 being normal. Examinations were made every three months, gross changes being looked for daily. Bacteriological and biochemical examination of milk was made every 30–60 days.

(a) Seven udders, five of first lactation and two through the first and second lactations, were selected for study as being normal by standards other than those of a physical nature. In about 70% of these there was "slight" induration and in 30% "distinct" induration, from which the authors conclude that even distinct indurations are not in themselves necessarily abnormal.

(b) About 73% of class 4 udders, 33% of class 3, 5% of class 2, and none of class 1 udders were infected with streptococci. Half the udders, however, were placed in class 3.

(c) The best correlation of physical examination with streptococcal infection (88%) concerned class 4 udders, whereas percentage figures of infection for class 3 and 2 udders were 28 and 4 respectively.

The types of mastitis in class 2 and 3 udders were classified as uninfected, and as due to streptococci, staphylococci, and coliform organisms. Twice as many class 2 udders were uninfected as those of class 3. Staphylococci were more numerous in class 2 than in class 3 udders but clinical mastitis was commoner in the latter.

—C. V. WATKINS.

ROSENOW, E. C. (1944). **A filterable infectious agent obtained from alpha streptococci isolated in studies of a case of poliomyelitis.**—*Amer. J. clin. Path.* **14.** 519–533. **1375**

In a continuation of previous studies, R. claims to have again shown a relationship between a streptococcus isolated from a case of human poliomyelitis and the virus usually associated with this disease [see also *V. B.* **15.** 70].—R. E. GLOVER.

BROOKE, W. S., & DAY, R. (1944). **Immunization with the vole acid fast bacillus against experimental tuberculosis.**—*Johns Hopk. Hosp. Bull.* **74.** 275–293. **1376**

Groups of approximately 40 g. pigs were treated as follows :– the first group received two doses of 4 mg. living vole bacilli, the second equivalent amounts of heat-killed vole bacilli, and the third 10 mg. BCG ; the fourth group served as controls. Seven weeks after the first vaccination all the animals received 0·000,001 mg. virulent human type bacilli.

After nine months, 78% of the controls and 35% of the animals protected with heat-killed vaccine developed generalized tuberculosis, whereas in the two remaining groups only 18% were severely affected. After 14 months, 71% of the group receiving living vole bacilli and 50% of those receiving BCG were free from gross tuberculosis. The vole bacillus is thus regarded as at least equal to and possibly slightly superior to BCG as an immunizing agent. No evidence was obtained of progressive lesions due to the vole bacillus except when large doses were given, particularly by the intravenous route.—R. E. GLOVER.

BABLET, J., & VAN DEINSE, F. (1943). Trois cas d'infection oculaire spécifique au cours de la tuberculose expérimentale par bacilles atténués. **[Three cases of specific ocular infection in the course of experimental infection with attenuated tubercle bacilli].**—*Ann. Inst. Pasteur.* **69.** 45–47. **1377**

A note on eye infection in three laboratory animals inoculated with an attenuated culture of tubercle bacilli passaged in bile-potato medium. A rabbit inoculated intravenously with a bovine type strain passaged 50 times on the medium developed lesions in both eyes nine months later. A g. pig inoculated with the same strain so passaged 48 times developed lesions in the left eye eighteen months later. Another g. pig inoculated into the mediastinum with a human type culture so passaged 33 times developed an eye lesion nine months later. All three animals were killed and examined and notes are given of the lesions found.—R. M. ARNOLD.

BIESTER, H. E., & SCHWARTE, L. H. (1944). **Listerellosis of sheep.**—*N. Amer. Vet.* **25.** 34–37. **1378**

This is a brief general discussion on the diagnosis, clinical appearances and lesions. In the opinion of the authors, the condition resembles histopathologically changes that occur in some neurotropic virus infections. The principal lesions observed were perivascular cuffing of the cerebral and spinal blood vessels. Large numbers of monocytes and a number of leucocytes were observed in the neural canal, and the ependymal lining showed extensive areas of necrosis with monocytic and leucocytic infiltration. The glands of the turbinate mucosa were distended and filled with mucus and the epithelium showed mucoid degeneration. Monocytes and leucocytes were noted in the sub-mucosa.

There are seven figures, including three of affected sheep and three of sections of nervous tissue.

—D. A. MACPHERSON.

SCHOFIELD, F. W. (1944). **Salmonellosis in swine. A field and laboratory study of four outbreaks.**—*Canad. J. comp. Med.* **8.** 273–280. **1379**

An enteric infection of swine, chiefly affecting young feeder pigs, is quite prevalent in Ontario. Six strains of *Salmonella cholerae-suis*, isolated from three outbreaks, were of the Kunzendorf type. The nutrition of the pig is considered to have a direct bearing upon susceptibility to infection. *S. cholerae-suis* is responsible for the damage to the mucous membrane, which later is often invaded by *Fusiformis necrophorus*, a normal inhabitant of the intestine. Salmonella bacterin was highly effective both as a preventive and curative agent. Pigs between the ages of 8 and 16 weeks were particularly susceptible to the infection. Poor sanitation and overcrowding were conducive to the rapid spread of infection. Raising the pigs in colony houses on good pasture was an excellent non-specific preventive measure.—R. GWATKIN (CANADA).

TRUDEL, F. (1944). **Calfhood vaccination against brucellosis in the Province of Quebec.**—*Canad. J. comp. Med.* **8.** 97–101. **1380**

Calfhood vaccination against brucellosis with strain 19 was introduced in the Province of Quebec in 1940. This preliminary report gives the results on 3,007 calves from the 147 herds to which this vaccination programme was applied in the first year. Approximately 10% of the animals of these herds reacted positively to the blood test. The vaccine was made at the provincial laboratory according to the technique of the U.S. Bureau of Animal Industry and under supervision of the Animal Diseases Research Institute, Dominion Department of Agriculture. Special measures such as rapid transportation, previous notification of the veterinarian, packing in ice etc. were used to ensure a potent vaccine being employed. Calves were blood-tested before inoculation and at regular intervals thereafter.

Of the 1,500 calves followed through to their first or second lactation, the incidence of abortion was 0·86%. Approximately 4% of the calves showed no agglutination titre after vaccination and had to be revaccinated. 12 calves (0·29%) reacted to the agglutination test prior to vaccination. Eight lost their titre after vaccination and remained negative after calving. 16 calves (0·5%)

showed fluctuating titres after vaccination. Four of these aborted and twelve calved normally. It is suggested that in these 16 calves the agglutination titre may have resulted from "exposure" reaction. 67·6% of the animals aborting or showing a variable reaction after vaccination were vaccinated between four and six months of age. The best time for vaccination would seem to be between six and eight months.

—J. L. BYRNE (CANADA).

LIVE, I., STUBBS, E. L., & GARDINER, M. R. (1944). **Agglutinative tests and allergic skin tests on a herd with chronic brucellosis.**—*N. Amer. Vet.* **25.** 468–475. **1381**

This article is a sequence to an earlier one [*V. B.* **13.** 121] on the production of the sonic filtrate of *Brucella abortus*, and allergic tests with it on rabbits and g. pigs. A report is now made on its allergic activity in cattle.

As a preliminary test of specificity, 0·1 ml. of a filtrate containing 0·125–0·5 mg. protein was injected intradermally into the caudal fold or vulva of 17 cows negative to the aggln. test and with a "clean" history.

Results were seen after 48 or 72 hours, the criterion of a positive reaction being a swelling of the fold to twice its normal thickness. There were no reactions in these cows, nor in tests repeated as often as 12 times at two-monthly intervals. Before each test, blood was drawn for the aggln. test. The brucella antigen supplied by the United States Bureau of Animal Industry was used and a reaction at 1 : 100 was considered positive. After each test, agglutinin titres of 1 : 50–1 : 100 were recorded, but these usually disappeared in about eight weeks.

For the tests on infected animals, a herd of 117 Guernseys was used; 63 of these had given positive reactions to the aggln. test 4–9 years previously. Five skin and five aggln. tests were carried out on these animals over a period of a year. A single positive reaction to either test in any animal was regarded as a positive allergic result. Fluctuations occurring in the results were considered to be related to the pregnancy cycles of the animals.

Of the 63 old reactors 41 were still positive to the aggln. test; 33 of these yielded good skin reactions, but the reactions in the other eight were negative to doubtful. Seventeen were doubtful to the aggln. test and all these gave positive skin reactions. Three animals, negative to the aggln. test responded positively to the skin test, and two, one suspicious and one negative to the aggln. test, were both negative to the skin test. Thus, using both tests, 61 were positive out of 63. In the absence of P.M. bacteriological tests, there was, of course, no proof that the animals were infected.

The other group consisted of 54 animals, which had given doubtful or negative aggln. reactions before being added to this herd of "old reactors". Up till that time none had aborted, but since being added to the herd, 28 had aborted, and in 13 the placenta had been retained. Of 35 positive to the aggln. test, 33 gave positive skin tests. Of five suspicious and nine negative to the aggln. test, all were negative to the skin test. Here a combination of both tests gave 49 positive reactors out of the 54.—R. COOMBS.

GILMAN, H. L. (1944). **Undulant fever caused by Brucella Abortus strain 19.**—*Cornell Vet.* **34.** 193–194. **1382**

While vaccinating a calf a student sprayed several drops of strain 19 into his right eye. The eye was washed out at once. Sixteen days later he contracted a severe headache and alternate fever and chill and abdominal pain. Blood cultures yielded brucella organisms. The temperature varied from 99°F. to 104·4°F. and recovery took place about seven weeks after the onset of symptoms. The patient was treated with sulphadiazine. The agglutination titre rose to partial agglutination at 1 : 51,200. The recovered organisms grew aerobically and on basic fuchsin media. G. pigs inoculated yielded only mild lesions and an agglutination titre of 1 : 200. It appears that strain 19 is capable of infecting human beings and care should be taken in handling the vaccine. A lock or screw type of syringe with a needle of sufficiently large bore is advisable and the hands should be washed and disinfected after using the vaccine.—S. J. GILBERT.

CAMERON, H. S., & CARLSON, P. A. (1944). **Brucellosis of swine. II. Eradication by blood test and segregation. III. Studies on the diagnostic titer in the individual.**—*Amer. J. vet. Res.* **5.** 329–332 and 333–336. [For part I, see *V. B.* **14.** 150]. **1383**

II. A programme of eradication has been applied to a number of field herds by segregation at weaning and using only animals negative at 1 : 25 for breeding. Infected stock are slaughtered as replacements become available. Data concerning two of these herds are given and the details discussed. In infected mature stock, agglutinins tend to recede and should such stock prove negative as carriers, resistance they may have acquired may be of value in the control of the disease in herds where segregation is not practicable.

III. In order to establish a diagnostic titre applicable to individual pigs, experiments were performed to ascertain the relation between the agglutination titre and the presence of *Br. suis* in the blood of artificially infected swine. Blood reactions appeared eight days after exposure (dosage *per os* with culture of *Br. suis*) in six out of ten animals, and in four of the six reactors blood cultures were positive. By the tenth day all ten animals reacted to at least 1 : 6·25. Positive blood cultures were infrequent after eleven days, although two pigs were positive 35 days after exposure. Positive blood cultures were obtained on two occasions when the blood was negative at 1 : 6·25. The absence of agglutinins before exposure and after recovery suggests that a reaction at 1 : 6·25 in swine is specific, and is evidence of exposure to infection. The absence of agglutinins at this titre does not mean that an exposed animal has remained healthy. Non-reacting animals in an infected herd should not be selected as uninfected until repeated tests indicate that the condition is not being actively spread in the group.—S. J. GILBERT.

ASTHANA, R. P. (1944). **Aspergillosis in fowls.**—*Proc. Indian Acad. Sci.* **20.** Sect. B. 43–47. **1384**

Outbreaks of aspergillosis are recorded for the first time in India, from several places in the Central Provinces. Mortality was higher in chicks than in adult birds, while there was great variation in susceptibility between breeds. Affected birds were dull and feverish, showed inappetence and photophobia, and developed leg and wing paralysis. There was sneezing, a rattling cough and a slimy discharge from the nose and beak. In acute cases sudden death occurred before onset of symptoms; in other cases death might occur in from 1–4 weeks. Epizootics occurred during the humid season, when poultry feed was shown to be laden with the fungus spores. A brief account is given of the lesions found. They affected the lungs, bronchi, and trachea, the intestines, the caecum being filled with what is described as a cheesy pus, the peritoneum, kidneys, ovaries, testes, and heart.

Pure cultures of an *Aspergillus* sp. were obtained from infected organs and blood. The culture fungus, given *per os* by insufflation or by subcutaneous inocula-

tion, produced the disease in healthy birds. A similar fungus was grown from eggs from infected pens. The cultural and morphological characters of the fungus which resembled *Aspergillus fumigatus* var. *alpha* are described.—V. R. RAJAGOPALAN (INDIA).

BEESON, P. B., BRANNON, E. S., & WARREN, J. V. (1945). **Observations on the sites of removal of bacteria from the blood in patients with bacterial endocarditis.**—*J. exp. Med.* **81.** 9–23. [Authors' summary copied *verbatim*]. **1385**

In 6 patients with bacterial endocarditis studies were made of the bacterial content of arterial and venous blood. Paired samples were collected, approximately simultaneously, from two different locations in the circulatory system, and colony counts were determined. As many as 48 specimens were taken for culture during a single period of study. Venous blood was drawn not only from different locations in the extremities, but also from the superior and inferior venae cavae, the right auricle, and the hepatic and renal veins.

As would be expected, colony counts were highest in arterial blood. Blood from the antecubital veins gave colony counts only slightly lower than arterial blood. In the femoral veins, on the other hand, there were appreciably fewer organisms. This difference is attributed to the type of tissues drained by the two veins. Colony counts in blood from the superior and inferior venae cavae were also lower than arterial counts, the ratio being comparable to that found in femoral vein blood. In the renal veins colony counts were only slightly below the arterial level indicating that few organisms are removed from the blood during passage through the kidneys. The greatest reduction in bacterial content was found in hepatic vein blood. In 3 of the 6 subjects this reduction amounted to more than 95 per cent, and in all subjects the difference was very considerable. Mixed venous blood in the right auricle of the heart gave colony counts which were usually one-half to two-thirds as high as in corresponding samples of arterial blood.

An interesting finding in these studies was a remarkable constancy of the bacterial content of arterial blood, during periods of 1 or 2 hours. Despite the fact that a considerable portion of the bacteria which leave the heart in arterial blood appear to be removed during a single circuit of the body, the number of bacteria in successive samples of arterial blood shows little change. This indicates that in bacterial endocarditis organisms are discharged into the blood from the endocardial vegetations at a comparatively even rate, rather than in a haphazard fashion as a result of the breaking off of infected particles.

SPRINCE, H., & WOOLLEY, D. W. (1944). **Relationship of a new growth factor required by certain hemolytic streptococci to growth phenomena in other bacteria.** —*J. exp. Med.* **80.** 213–217. **1386**

A growth factor required by certain haemolytic streptococci was further studied by preparing a series of concentrates of the factor from different sources and by completely dissimilar methods. The factor appears to be very similar to, and is probably identical with, recently described growth factors for *Lactobacillus casei* and Smith's *Streptococcus lactis*, and has been given the name " strepogenin ". Certain of its general solubility characteristics are described and an improved method for its assay by the use of *Lactobacillus casei* is presented. —A. EDEN.

See also absts. **1483**, **1497**, **1522**, **1528-1531** (mastitis), **1436** (streptococcal sterility of cattle), **1418** (meningococcus), **1524** (anthrax), **1411-1414**, **1484**, **1519**, **1533** (TB.), **1433** (swine influenza), **1530** (swine erysipelas), **1431** (erysipelas and mycotic encephalomalacia in turkeys), **1468** (pasteurella), **1501**, **1502**, **1531** (salmonella), **1417**, **1500**, **1519**, **1522**, **1530**, **1531** (brucellosis), **1485** (gas gangrene), **1379**, **1531** (*Fusiformis necrophorus*), **1531** (pullorum disease, *Vibrio foetus*, *Corynebact. equi*, *Haemophilus gallinarum*), **1506** (spore viability).

DISEASES CAUSED BY PROTOZOAN PARASITES

SHISHLYAEVA, Z. S. (1940). Nablyudeniya nad zhiznesposobnost'yu Plasmodium cathemerium v trupakh ptits. [**Survival of *P. cathemerium* in dead birds**].—*Med. Parazitol., Moscow.* **9.** 288–290. [French summary]. **1387**

In siskins inoculated with the blood of other siskins which had been naturally infected with *P. cathemerium* and kept 2–5 days in a refrigerator after death, the period of incubation was 10–18 days and the infection ran a chronic course.—A. MOLDAWSKY.

STEEVENSON, G. F. (1944). **Piroplasmosis in ponies and donkeys imported into India from South Africa.** —*J. R. Army vet. Cps.* **15.** 97–99. **1388**

During 20 years' experience, S. has not seen a clinical case of equine piroplasmosis in an Indian-bred horse or mule, but considers there is no doubt that they are carriers, and points to the similar conditions which German investigators found in native animals in Macedonia. Adverse conditions may lead to a breakdown of immunity in carrier animals, and it is a common occurrence for donkeys and ponies from South Africa to exhibit anaemia and debility, and in some cases detectable piroplasms, after the hardships of the sea voyage to India. Such animals improve rapidly under quinine treatment, *viz*, 30 grains of quinine hydrochloride intravenously for a small donkey, and 1 drachm for a large one, 0·5 grain strychnine being given a few minutes before treatment to weak animals.

It is stated that in India a low reading of the graduated tube test [see *Handbook on Contagious and Infectious Diseases of Animals.* (1942). Delhi : Manager of Publications. p. 213] is indicative usually of piroplasmosis or surra. In this test, if 10 ml. of blood is used with 2 ml. of a 10% sodium citrate solution, then the reading in ml. multiplied by 2,000,000 gives the approximate number of red blood corpuscles per cu. mm. of blood. The normal reading is 3·2–3·4 ml. During convalescence tests should be made weekly to ascertain the progress of the case.—U. F. RICHARDSON.

SOMAN, W. V. (1944). **Some observations on equine piroplasmosis.**—*Indian vet. J.* **21.** 22–28. **1389**

Since 1936, 261 cases of equine piroplasmosis have been reported from Baroda State. *Babesia equi* invariably predominated, but *B. caballi* appeared in the blood when the virulence of *B. equi* was abated by treatment. Acid quinine hydrobromide given intravenously was efficacious for *B. equi* infection at the rate of one drachm in 40 ml. distilled water per 800 lb. body weight. Only 4–5% of treated cases ended fatally. *B. caballi* infection was treated with acaprin. Complications following piroplasmosis as noted by the author were anaemia, lumbago, keratitis, retinitis pigmentosa, and oedematous swellings.—H. N. RAY (INDIA).

*BESSEMANS, A., WITTEBOLLE, P., & DE BORCHGRAVE, O. (1939). Note expérimentale sur les leptospires ictéro-hémorragiques et canicoles. [**Experiments on *Leptospira icterohaemorrhagiae* and *L. canicola***].—*C. R. Congr. franç. Méd.* pp. 142–144. [Abst. from abst. in *Jber. Vet.-Med.* **71.** 224]. **1390**

Investigations on 13 strains of leptospira with homologous and heterologous sera in dilutions of 1 : 100–1 : 100,000 showed that lysis occurred at 1 : 100, but that this decreased with dilution until it was replaced by agglutination. This agglutination extended over most of the preparation, but at the margin was replaced by lysis. At dilutions of 1 : 100 – 1 : 2, agglutination occurred and was followed immediately by lysis. Both results are specific for the leptospira strains examined and allow the separation of *L. canicola* from *L. icterohaemorrhagiae*.—U. F. RICHARDSON.

*BESSEMANS, A. (1941). Syphilis expérimentale inapparente du chat domestique commun. **[Inapparent experimental syphilis in domestic cats].**—*Acta biol. belg.* **1.** 13–15. [Abst. from abst. in *Jber. Vet.-Med.* **71.** 223]. **1391**

Syphilis material rich in spirochaetes was inoculated subcutaneously into three kittens 3–11 days old. The two youngest animals died on the 15th and 38th days respectively after the inoculation, and the oldest animal was killed after 83 days. None of the three showed any infection of the lymph nodes nearest the seat of inoculation. When, however, the spleen, or the spleen and lymph nodes, were inoculated into rabbits, typical syphilitic lesions developed, which contained spirochaetes.—U. F. RICHARDSON.

See also absts. **1507** (trypanosomes), **1486** (leishmania), **1530**, **1531** (bovine trichomoniasis), **1431** (hexamitiasis), **1531** (blackhead), **1487** (avian coccidiosis), **1522** (*Babesia bovis* in Eire), **1488** (anaplasmosis), **1508**, **1509** (staining and mounting).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

MOLLIN, F. E. (1944). **Keep out foot-and-mouth disease (revised). A presentation of facts concerning the long pending Argentine sanitary convention and arguments against its ratification.** pp. 32. Denver, Col.: American National Live Stock Association. [8vo]. **1392**

The Argentine sanitary convention, which has been before the U.S. Senate Foreign Relations Committee since 1935, is designed to alter certain provisions of the Smoot-Hawley Tariff Act, so that, instead of forbidding importation of meat products from any country where F. & M. disease or rinderpest exists, it would permit zoning of the Argentine and admission of such products from zones declared to be free from those diseases.

M. considers the history of outbreaks of F. & M. disease in the U.S.A. and Great Britain, the possibility of survival of the virus for long periods in meat products and the danger of recognizing so-called clean zones in a country where the disease is endemic; he concludes that the retention of the embargo is fully justified and that any relaxation of the present strict control of imports would constitute a grave risk to the livestock industry of the U.S.A.—W. M. HENDERSON.

BONÉT-MAURY, P. (1943). Evaluation, par irradiation alpha, de la taille du virus de la fièvre aphteuse. **[Calculation, by means of alpha rays, of the size of foot and mouth disease virus].**—*Ann. Inst. Pasteur.* **69.** 22–26. **1393**

F. & M. disease virus (type O) was obtained from experimentally produced lesions in the pad of a g. pig. Using a method described previously [(1942). **J. Chim. phys.* **39.** 116–128.], the author estimated that the diameter of the virus is 20–40 mμ (mean 30 mμ). This is considerably larger than the accepted figure of 10–12 mμ based on ultrafiltration methods.—R. M. A.

—. (1943). Ratschläge an Ärzte zur Bekämpfung der Tollwut. **[Counsel for doctors on the control of rabies].**—*Reichsgesundheitsblatt.* **18.** 661–667. **1394**

A general review of the disease with emphasis on control and prevention, particularly with regard to the circumstances that warrant the application of prophylactic treatment. Two anti-rabies treatments are used: SEMPLE's inactivated phenol vaccine and HEMPT's inactivated ether-phenol vaccine.

Official sources of information show that of 5,001 domesticated animals affected with rabies or suspected rabies in Germany from 1927 to 1937, 80% were dogs, 12% cats, 7% cattle and 1% horses, sheep, goats and swine. Birds were only rarely affected.—W. M. H.

REMLINGER, P. (1944). Sur la nécessité d'une nouvelle conférence internationale de la rage. **[The need for a new rabies conference].**—*Arch. Inst. Pasteur Algér.* **22.** 141–144. **1395**

R. considers that there is a need for another international rabies conference in view of the problems that have arisen since the first conference in 1927. He suggests as subjects for discussion:—the nature of the virus, the choice of the mouse or the rabbit for biological tests, the influence of rabbit passage on the virus, plurality of strains, the use of phenol vaccines in decentralizing treatment, neuroparalytic accidents following treatment, and the vaccination of domesticated animals. He proposes that the conference should be held in Spain instead of in New York as he had previously suggested.—W. M. HENDERSON.

I. MILLER, G. L. (1944). **Influence of pH and of certain other conditions on the stability of the infectivity and red cell agglutinating activity of influenza virus.**—*J. exp. Med.* **80.** 507–520. **1396**

II. LAUFFER, M. A., & MILLER, G. L. (1944). **The sedimentation rate of the biological activities of influenza A virus.**—*Ibid.* 521–529. **1397**

III. LAUFFER, M. A., & STANLEY, W. M. (1944). **Biophysical properties of preparations of PR8 influenza virus.**—*Ibid.* 531–548. **1398**

IV. MILLER, G. L., LAUFFER, M. A., & STANLEY, W. M. (1944). **Electrophoretic studies on PR8 influenza virus.**—*Ibid.* 549–559. **1399**

I. A detailed investigation has been made of the pH stability of influenza virus with respect to infectivity for mice and to chick cell agglutinating (CCA) activity. Tests were made on an egg-propagated A virus (PR8), B virus (Lee) and swine virus (Shope), using citrate-phosphate-glycine buffers ranging from pH 3·0 to pH 11·0. From pH 3·0 to pH 5·0 infectivity of A virus was lost in one hour at 23°C. The highest stability occurred between pH 6·0 and 7·0 since 10% of active virus was still detectable after ten days. Losses in infectivity at pH 5·0 and lower were accompanied by a similar debasement in CCA units, whereas at ranges of pH 8·0 and over, infectivity was lost but not CCA activity. With virus B on the other hand, the level of maximum stability was pH 7·9 or higher, whilst Shope virus was intermediate at pH 7·0 to 7·9. In general, the rate of loss in infectivity was greater than that of CCA activity.

M. does not consider that the results imply the presence of two types of particle since the CCA assay is more delicate than the infectivity test.

II. Two strains of influenza A virus (PR8 and F12) were subjected to high speed spinning in an air-driven ultracentrifuge at 11,000 revs. per minute using a separation cell. Several successive experiments were carried out in order to correlate the sedimentation rate

of the visible boundary with that of mouse infectivity, CCA units and nitrogen content. Agreement between the three components was close and indicates their association with a common particle characterized as a sphere with a diameter of about 100 mμ.

III. The average particle size of influenza A virus was determined by various methods used by previous workers. The figures obtained were substantially in accord with those already published. The size and shape of the particle as revealed by electron micrographs is described.

IV. Infective allantoic fluid (PR8 virus) was analysed by micro-electrophoresis and by moving boundary electrophoresis methods. Virus concentrated by high speed centrifugation was added to a collodion particle suspension and the coating of the latter observed near the iso-electric point of the virus. The average figures were between pH 4·9 and 5·2. The variability was shown to be due to the presence in allantoic fluid of a normal particle of a high molecular weight with an iso-electric point of pH 2·3. The data obtained by the moving boundary experiments showed that the normal particle was quite homogeneous with a mobility of $-1{\cdot}03 \times 10^{-4}$ cm. per sec. per volt per cm. at pH 4·0, whereas the influenza virus particle had two separate components with figures of $-0{\cdot}61$ units (slow particle) and $-1{\cdot}11$ units (fast particle). The slow fraction contained the bulk of the CCA component.—R. E. Glover.

Friedewald, W. F. (1944). **Adjuvants in immunization with influenza virus vaccines.**—*J. exp. Med.* **80.** 477–491. **1400**

Influenza A virus (concentrated, formalinized allantoic fluid) was added to killed tubercle bacilli suspended in liquid paraffin and an absorption base known as falba (a commercial preparation containing beeswax etc.). The immunity induced by this vaccine was compared with that produced by PR8 virus alone and in combination with each of the components of the main vaccine. The two methods used were immunity tests in mice and the production of antibodies in ferrets and rabbits.

It was found that mice receiving virus in saline resisted 100 minimum infective test doses four weeks later and that immunity had completely waned at 26 weeks. On the other hand, mice receiving the full complex resisted 1,000,000 M.I.D. at four weeks and still possessed some immunity after 26 weeks. Antibody response in rabbits and ferrets was similarly enhanced by the complex: in the latter species it was not only notably superior to that evoked by saline suspensions given subcutaneously but reached a level comparable to that produced by the intranasal instillation of living virus. An even higher level of immune response was encountered when killed *Mycobacterium butyricum* was substituted for *M. tuberculosis*.

The favourable results are attributed to the slow absorption of antigen from the stable water-in-oil emulsions produced by these methods.—R. E. Glover.

Steinhaus, E. A., & Parker, R. R. (1944). **The isolation of a filter-passing agent from the rabbit tick *Haemaphysalis leporis-palustris* Packard.**—*Publ. Hlth Rep., Wash.* **59.** 1528–1529. **1401**

A filter-passing agent pathogenic for g. pigs was isolated from nymphs and adults of *H. leporis-palustris*. G. pigs infected by subcutaneous, intraperitoneal, intracerebral, or oral administration of virus showed a febrile reaction after 4–10 days, with splenic enlargement. The infection was never fatal. Rabbits, mice, and chick embryos were also susceptible. There was no cross-immunity between this agent and those of Rocky Mountain spotted fever or American "Q" fever.—R. E. Glover.

*Ilieff, T. (1942). Coltivazione del virus della laringotracheite infettiva dei polli (dominante in Italia) nell'uovo. **[Cultivation of the virus of avian laryngotracheitis in the fowl embryo].**—*Clin. vet., Milano.* **65.** 389–393. [Abst. from abst. in *Jber. Vet.-Med.* **71.** 221]. **1402**

A report of the growth on the chorio-allantois of the developing chick of the virus of a poultry disease, prevalent in Italy and usually regarded as being infectious laryngo-tracheitis. Undiluted virus suspensions caused death of the embryo within 24 hours; dilute suspensions produced typical lesions on the chorio-allantoic membrane before the death of the embryo occurred at 36–72 hours. Titres of 10^{-9} to 10^{-11} were recorded.—W. M. Henderson.

*Ilieff, T., & Barei, S. (1942). Immunizzazione dei polli contro la laringo-tracheite infettiva mediante il "virus da coltura" adsorbito all'idrossido di alluminio. **[Immunization of fowls against avian laryngotracheitis with culture virus adsorbed on aluminium hydroxide].**—*Clin. vet., Milano.* **65.** 394–397. [Abst. from abst. in *Jber. Vet.-Med.* **71.** 221–222]. **1403**

Good results are claimed for an aluminium hydroxide adsorbed vaccine prepared by mixing equal parts of an 8% aqueous suspension of egg-cultured virus [see preceding abstract] and a 4% suspension of $Al(OH)_3$, adding phenol to 0·425% and shaking for 30 minutes. This mixture was kept at 37°C. for six hours and then stored at 1–3°C. The subcutaneous dose was from 2 ml. for adult poultry to 0·5 ml. for birds of 1–3 months.—W. M. Henderson.

—. (1944). Merkblatt über die Papageienkrankheit. **[Notice on psittacosis].**—*Reichsgesundheitsblatt.* **19.** 137–140. **1404**

A general account of psittacosis from a public health point of view. In Germany from 1935 to 1941, 191 cases were diagnosed in man. 21% of these cases were fatal. The budgerigar has been incriminated as the source of infection in the majority of instances.

—W. M. Henderson.

Francis, T., Jr. (1944). **Virus pneumonia.**—*Canad. J. publ. Hlth.* **35.** 49–54. **1405**

The last five years have witnessed an increased prevalence of a particular type of pneumonia in human beings. The major features are a wide distribution, relative mildness, X-ray evidence out of proportion to physical signs, absence from the sputum of the usual bacterial agents, and resistance to sulphonamide therapy. There is little evidence that it is highly contagious. It is not psittacosis, ornithosis, or influenza A or B infection. The term "virus pneumonia" must be used with reservation as there is no proof that a virus is responsible for the condition.

—R. Gwatkin (Canada).

Dingle, J. H., Abernethy, T. J., Badger, G. F., Buddingh, G. J., Feller, A. E., Langmuir, A. D., Ruegsegger, J. M., & Wood, W. B., Jr. (1944). **Primary atypical pneumonia, etiology unknown. (Parts II & III).**—*Amer. J. Hyg.* **39.** 197–268 and 269–336. [For part I, see *V. B.* **14.** 271]. **1406**

II. Detailed figures are given to show the seasonal incidence of primary atypical pneumonia and its relation to acute respiratory infections. The possibilities of spread by contaminated food and water, animal reservoirs of infection and the role of insect vectors were explored, but no clear evidence was obtained that any of these factors was of importance.

Epidemiological observations suggested that the disease is transmitted by contact, although the evidence was somewhat conflicting. Mild cases passing unrecog-

nized may be responsible for maintaining infection in a community.

III. The results of routine cultures of pharyngeal washings and sputa showed that the organisms isolated were mainly those considered to be normal for the respiratory tract of man. Rickettsia were never found, but the virus of meningo-pneumonitis was recovered from a few patients; the significance of this finding is not clear. Although no new virus was isolated, the authors think that the general picture suggests the action of an agent of this type.—R. E. GLOVER.

OLSON, B. J., & LARSON, C. L. (1944). **An epidemic of a severe pneumonitis in the Bayou region of Louisiana. IV. A preliminary note on etiology.**—*Publ. Hlth Rep., Wash.* **59.** 1373–1374. **1407**

A virus of the ornithosis group, pathogenic for mice and g. pigs, was isolated from the throat washings of three out of four cases of human pneumonitis. Elementary bodies were readily demonstrated in the tissues of the experimental animals. The high susceptibility of the g. pig, and the transmission of the virus to mice by routes other than intranasal, suggested the action of a new aetiological agent.—R. E. GLOVER.

ELFORD, W. J., & VAN DEN ENDE, M. (1944). **Studies on the viability and filterability of typhus rickettsiae.**—*Brit. J. exp. Path.* **25.** 213–220. [Authors' summary copied *verbatim*]. **1408**

Factors influencing the viability of typhus rickettsiae contained in suspensions of murine and epidemic strains grown in egg embryos and mouse lungs have been investigated. Serum broth, of the media tested, provided conditions most favourable for the maintenance of viability, while the optimum zone of pH was from 6 to 8·5. Rickettsial suspensions, which rapidly lose activity at 0°C. and above, may be stored for months at −77°C. with little alteration in potency.

Comparative filtration experiments with the murine and epidemic typhus strains indicated a general similarity in filtration behaviour no matter whether the organism had been grown in yolk sac or mouse lung. A gradocol membrane of 500 mμ porosity completely retained all rickettsiae, while the filtrate from a 700 mμ membrane was invariably positive following the fractionating procedure adopted. It is considered improbable that the smallest phase of the rickettsial strains here studied is less than 400 to 500 mμ in diameter or width. The filtration data also suggest that, for each strain, the organisms are pleomorphic, which agrees with microscopical evidence.

IRONS, J. V., BOHLS, S. W., THURMAN, D. C., Jr., & MCGREGOR, T. (1944). **Probable role of the cat flea, *Ctenocephalides felis*, in transmission of murine typhus.**—*Amer. J. trop. Med.* **24.** 359–362. **1409**

Several cases of murine typhus occurred in two families in Texas shortly after they had purchased kittens from a local store; these kittens were heavily infested with cat fleas. There was a history of typhus-like illness in employees of the store in past years. In the course of the investigation a laboratory worker also contracted infection. G. pigs injected with emulsions made from the fleas developed murine typhus, but suspensions of organs from the infested kittens failed to infect them. This is believed to be the first record of recovery of murine typhus from the cat flea.—R. E. GLOVER.

See also absts. **1530** (E.E., S.F.), **1433** (swine influenza), **1375** (poliomyelitis), **1520** (rickettsia in "pink eye" of sheep, rabbit myxoma), **1531** (virus abortion of mares, bovine encephalitis, S.F., avian encephalomyelitis and bronchitis, fowl paralysis, roup).

IMMUNITY

*DELAUNAY, A. (1942). Recherches sur la phagocytose. II. Les haptènes glucidiques, les antigènes glucido-lipidiques et le tactisme leucocytaire. [**Research on phagocytosis. II. Glycoid haptens, glyco-lipoid antigens, and leucotactic effect**].—*Rev. Immunol.* **7.** 33–52. [Abst. from abst. in *Zbl. Bakt. I. (Ref.).* **143.** 80]. [For previous article, see *V. B.* **14.** 10]. **1410**

Certain constituents of glucide nature in bacteria have the property in the living organism of attracting leucocytes. The polysaccharide haptens of various glyco-lipoid antigens are markedly chemotactic and 1 mg. injected intracutaneously in g. pigs causes an intense local accumulation of leucocytes. Polysaccharides found normally in the body, such as glycogen, are much less active. The glyco-lipoid antigens vary in their chemotactic effect according to whether normal or immune animals are used. In normal animals the injection of 1 mg. causes no leucocytosis, whereas 0·01 mg. gives a demonstrable response and 0·001 mg. is even more effective. In demonstrating the presence of minute amounts of glyco-lipoid antigens, histological examination for leucocyte response is much more delicate than serological tests. In immune animals large doses of antigen are markedly chemotactic.—E. G. W.

I. GERSTL, B., & TENNANT, R. (1941). **Factors in resistance to tuberculosis.**—*Yale J. Biol. Med.* **14.** 29–43. **1411**

II. WEISS, C., & HALLIDAY, N. (1944). **Studies on inflammation. V. Observations on the kinetics of cellular cathepsin II from organs of normal rabbits and those infected with virulent and non-virulent tubercle bacilli.**—*J. Immunol.* **49.** 251–262. [For part IV, see *V. B.* **12.** 418]. **1412**

III. WEISS, C., & HALLIDAY, N. (1944). **Studies on inflammation. VI. Inhibitory action of tuberculin on cathepsin.**—*Arch. Path.* **37.** 272–274. **1413**

IV. WEISS, C., & HALLIDAY, N. (1944). **Inflammation. VII. Selective inhibitory action of tuberculo-carbohydrate and phosphatide on cellular cathepsins from tuberculous tissues.**—*Proc. Soc. exp. Biol., N.Y.* **57.** 299–306. **1414**

I. Previous investigations have suggested that the high resistance of mice to tuberculosis may be due to the ability of mouse cells to break down the lipoid fractions of the tubercle bacillus.

Preliminary experiments showed that suspensions of mouse organs were capable of splitting off inorganic phosphorus from the tubercle phosphatide. This action was partly due to the presence of phosphatase. A more complete breakdown of the phosphatide occurred, however, with mouse tissues mixed with phosphatase than with phosphatase alone and a second participating factor had to be assumed to explain all the experimental findings. The exact nature of this agent has not yet been ascertained.

II. Experiments by LURIE [various articles in *J. exp. Med.*] have shown that following the intravenous injection of *Mycobacterium tuberculosis* into rabbits with some degree of immunity, the bacilli are destroyed in the liver and spleen but not in the lungs and kidney. The present authors have endeavoured to correlate these findings with the cathepsin II contents of these organs, using methods described by GERSTL *et al.* [see I, above]. The order of enzyme activity of normal organs was spleen > liver > kidney > lung. The rates of hydrolysis correspond, therefore, with the degree of natural immunity possessed by these tissues.

Organs of animals which had been inoculated with tubercle bacilli were also examined. An increased rate of activity of cathepsin II from spleen, lung and kidney was detected : the liver was not affected.

III & IV. An endocellular enzyme (cathepsin II) derived from tuberculous tissues is concerned with cellular growth and repair. The effects of tuberculo-phosphatide and tuberculo-carbohydrate on the enzyme were studied in a system containing benzoyl-*l*-arginine-amide and cysteine.

It was found that the tuberculo-phosphatide exerted a much greater inhibitory action on cathepsin from tuberculous rabbit tissues than from normal tissues. The results with carbohydrate were even more pronounced since no effect on normal liver cathepsin was noted but there was a very strong inhibition of the enzyme from tuberculous tissues.

These observations may throw light on the mechanism of caseation and softening and may explain the cytotoxic action of tuberculin *in vitro*.—R. E. GLOVER.

HARRIS, T. N., GRIMM, E., MERTENS, E., & EHRICH, W. E. (1945). **The rôle of the lymphocyte in antibody formation.**—*J. exp. Med.* **81.** 73–83. [Authors' summary copied *verbatim*]. **1415**

Following the injection of typhoid antigen or sheep erythrocytes into the pad of the rabbit's hind foot, lymph from the efferent lymphatic of the popliteal lymph node was collected and analyzed for antibody content.

On separating the lymphocytes from the lymph plasma, it was found that the antibody titer of the cell extract was substantially and consistently higher than that of the surrounding fluid. This difference was greatest at the time of greatest rate of increase of antibody titer in the whole lymph, rather than when the antibody titer of the lymph plasma was highest.

These results can only be interpreted to mean that the lymphocytes either produce antibodies or take them up from the lymph plasma. Incubation *in vitro* of lymphocytes containing one species of antibody with lymph plasma containing another showed that antibodies pass from the cells to the supernatant lymph fluid to reach approximate equilibrium ; acquisition of antibody from supernatant lymph fluid was not observed. Similar results were obtained when normal lymphocytes were allowed to incubate *in vitro* in their own lymph fluid to which antibodies had been added. It was again found that antibodies were not absorbed or adsorbed by lymphocytes. These results seem to indicate that lymphocytes are instrumental in the formation of antibodies.

LEIBOVITZ, A. (1943). **A comparative study of the intradermal and subcutaneous methods for typhoid vaccination.**—*Yale J. Biol. Med.* **15.** 609–614. [Author's summary and conclusions copied *verbatim*]. **1416**

1. The results of a comparative study of the intradermal and subcutaneous methods for anti-typhoid vaccination are described. 2. On the basis of the immunogenic response, the nature and frequency of reactions, and the cost in materials and time, the intradermal method is believed to be the preferable one.

TOVAR, R. M. (1944). **The opsonization test in brucellosis.**—*J. Immunol.* **49.** 203–207. **1417**

In previous work, a number of weak positives to the opsonic test for brucella infection had occurred in patients who were not infected with brucellosis. Following CASTANEDA [*V. B.* **13.** 278.] a study was made of the effects of various concentrations of sodium citrate mixed with the blood. 1% sodium citrate gave the best results and largely eliminated the effect of normal opsonins. This concentration has no inhibitory effect upon specific opsonins. Formalin-killed brucella were found suitable for performing the test and antigens could be standardized and preserved for several months.
—S. J. GILBERT.

KABAT, E. A., MILLER, C. P., KAISER, H., & FOSTER, A. Z. (1945). **Chemical studies on bacterial agglutination. VII. A quantitative study of the type specific and group specific antibodies in antimeningococcal sera of various species and their relation to mouse protection.**—*J. exp. Med.* **81.** 1–8. [Authors' summary copied *verbatim*]. **1418**

1. The quantitative method for the estimation of agglutinins has been applied to antimeningococcal horse, rabbit, and chicken sera and to the sera of humans convalescing from meningococcus meningitis. The type-specific and group-specific agglutinin N can be measured, using homologous and heterologous suspensions of meningococci.

2. Type I horse, rabbit, and chicken antimeningococcal sera contain considerable amounts of antibody which cannot be removed either by Type II meningococcus suspension or by preparations of the Type I specific polysaccharide. This residual type-specific antibody has marked potency in protecting mice against subsequent infection with meningococci.

3. Most human convalescent sera contain group-specific antibody. Small amounts of protective antibody and of antipolysaccharide are also formed.

4. Type I antisera absorbed with Type I polysaccharide and with Type II meningococci could be used as a guide in the purification of this new antigen.

HOLMES, L. F. (1941). **The effect of surface-tension depressants on certain serological systems.**—*Yale J. Biol. Med.* **14.** 155–175. [Author's summary copied *verbatim*]. **1419**

Three classes of surface-active agents—alcohols, soaps, and esters—were introduced into serological systems in an attempt to ascertain whether such agents could modify specific aggregation.

The soaps and three of the esters employed did inhibit immunological reactions. Another ester, cetyl pyridinium bromide, exhibited an opposite behaviour, that is, it decreased the stability of antigens and caused non-specific precipitation of serum. The alcohols did not alter the serological reactions in any detectable manner.

Detailed studies indicated that sodium lauryl sulphate, chosen as an example of the ester class, inhibited serological reactions through its property of increasing the negative charge on the antigen, and not by denaturation of the antiserum or antigen. Cataphoresis determinations with cetyl pyridinium bromide, on the other hand, demonstrated that this compound decreases the charge on the antigen surface.

It was observed that the compounds which increase antigen stability have the common characteristic of ionizing with their large, non-polar, organic portion as an anion. Cetyl pyridinium bromide, in contrast, ionizes with its organic, hydrophobic portion as a cation. It was concluded that the surface-active agents studied altered antigen stability because they formed highly absorbed ions, and that the alcohols were inactive because they do not ionize. The behaviour of surface-tension depressants in immunological systems can be correlated with their influence on the charge of the antigen particle, but it cannot be correlated with their probable action on interfacial tension.

KALMANSON, G. M., & BRONFENBRENNER, J. J. (1944). **Reversibility of sensitization of erythrocytes.**—*J. Lab. clin. Med.* **29.** 684–686. [Authors' summary copied *verbatim*]. **1420**

Red cells sensitized with an excess of amboceptor may be rendered completely resistant to complement, if the antibody is digested away by means of papain. These previously sensitized cells, after digestion by papain, can now be resensitized with a minimum of amboceptor.

TOBY, C. G., & NOBLE, R. L. (1944). **Factors affecting the development of resistance to traumatic shock in the rat.**—*Canad. J. Res.* Sect. E. **22.** 79–88. **1421**

The authors subjected rats to graded degrees of trauma by placing them in a drum which was rotated at 40 revolutions per minute; there were two projections inside the drum, therefore an animal received 80 impacts per minute.

Resistance in the rat is defined as "its ability to withstand 1,000 turns in the drum, whereas 800 turns caused approximately 100% mortality in the normal rat". Experiments showed that by gradually increasing the amounts of trauma, rats could be made completely resistant to amounts of trauma which would be fatal to normal animals. In rats exposed to repeated small amounts of trauma, there was less mortality than when an equal amount of trauma was given continuously. The length of the interval between runs of 100 turns appeared to be directly related to the total number of turns necessary to cause death. If a latent period of 24 to 48 hours was allowed to elapse after interrupted traumata, the animals were resistant and resistance lasted for at least five days.

It is the opinion of the authors that these results strongly support the toxin theory of traumatic shock. They believe that the toxin is rapidly destroyed in the body and that the process of detoxification in some way produces a resistant condition. They were unable to transfer resistance by transfusions from resistant to normal rats.

[These experiments may, to a limited degree, have a practical application in the transportation of livestock over long distances by land or sea where the mortality rate is high, and P.M. examination reveals lesions which suggest traumatic shock as being the cause of death.]

—THOS. MOORE (CANADA).

See also absts. **1376** (TB. immunization), **1381** (aggln. and allergic tests with *Br. abortus* sonic filtrate), **1530** (duration of immunity from calfhood vaccination), **1390** (lysis and aggln. of leptospira), **1403** (avian laryngotracheitis adsorbate vaccine), **1427** (mouse immunity to *Trichuris muris*), **1429** (serology of mouse tumours).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

HENRY, M. (1943). **The history and control of cattle tick in New South Wales.**—*Aust. vet. J.* **19.** 120–122. **1422**

In an address to the New South Wales Division of the Australian Veterinary Association, H. discusses the history and control of the cattle tick, *Boophilus australis*. The tick entered Australia from the East Indies about 1872 and by 1909 had reached the north-eastern corner of New South Wales. It spread as far south as Urunga in 1932, and since then has been gradually pushed northwards by progressive eradication projects. It is estimated that at the present rate and expenditure it will be eight years before the state is free of ticks. The annual cost of control is about £230,000.

Control is under a Cattle Tick Commission representing New South Wales, Queensland, and the Commonwealth; in New South Wales, executive action is in the hands of the Chief of the Division of Animal Industry of the Department of Agriculture.

In each eradication project, embracing a section of the infested region, all cattle, horses, sheep, and goats are dipped every 14 days for 15 months in an arsenical solution containing 8 lb. As_2O_3 per 400 gal. of water.

—H. McL. GORDON (AUSTRALIA).

See also absts. **1520** (sheep blowfly and other pests in Australia), **1524** (warble control in Cyprus), **1525** (sheep fleas in Gold Coast), **1409** (cat flea as murine typhus vector), **1530** (vectors of mastitis and E.E.), **1432** (*Ixodes holocyclus* and ataxia of horses), **1401** (virus in rabbit ticks), **1531** (ticks of Delaware), **1489**, **1520** (insecticides).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

BARNETT, L. (1943). **Hydatid disease in New Zealand. A brief note on incidence and prevention during the year 1942.**—*N.Z. med. J.* **42.** 260–261. **1423**

The hospital admissions and deaths from hydatid disease in human beings are given for the year 1942.

There was a small but definite reduction in the proportion of livers of cattle and sheep containing hydatid cysts and unsaleable on this account: in cattle and sheep at the main municipal abattoirs 35% were so rejected. The most marked decrease occurred in the previously high Christchurch figures, and it is hoped a corresponding decrease will be observed in the future in human incidence at the Christchurch Hospital.

In Central Otago an attempt is being made in one area to dose dogs regularly with arecoline and to prevent dogs being fed raw offal. A comparison will be made of the numbers of infected livers from stock in this area with those from other localities, where the Government's arecoline tablets may not always be used.

An attempt is being made to check the conclusion reported some years ago that one-third of the country dogs in New Zealand are infected or are "infectable" by *Echinococcus granulosus*.—M. B. B. (N. ZEALAND).

BARNETT, L. (1943). **Hydatid cysts: their location in the various organs and tissues of the body.**—*Aust. & N.Z. J. Surg.* **12.** 240–248. **1424**

This paper deals chiefly with the location of hydatid cysts in man. It deals very briefly with cysts in lower animals. Rabbits, g. pigs and cats are extremely difficult to infest. In cattle, cysts are commoner in the lungs than the liver; in horses they are rare except in the liver; in rabbits, they are limited to the kidneys. In squirrels cysts are found in the lungs only. In cattle, they tend to early obsolescence and sterility, whereas in sheep, probably the optimum host, they are usually fertile.—H. McL. GORDON (AUSTRALIA).

BAYLIS, H. A. (1944). **Tapeworm in trout. [Correspondence].**—*Brit. med. J.* Dec. 30th. 868. **1425**

B. has examined specimens of tapeworms obtained by DUGUID & SHEPPARD [*V. B.* **14.** 418.], HICKEY & HARRIS, UNSWORTH, and HICKEY [all *V. B.* **15.** 49.] by feeding experimental animals with plerocercoids obtained from infested trout. He has also examined tapeworms recovered from naturally infested gulls and concludes that all the specimens obtained experimentally resemble those recovered from the naturally infested gulls and that the species is *Diphyllobothrium dendriticum*, a little known parasite of gulls. The slight morphological differences seen in the different specimens obtained experimentally probably resulted from their development in abnormal hosts.—T. E. GIBSON.

SPINDLER, L. A., & ZIMMERMAN, H. E., Jr. (1944). **Effect of skim milk on the growth and acquisition of parasites by pigs under conditions of constant exposure to infection.**—*Proc. helminth. Soc. Wash.* **11.** 49–54. **1426**

Two tests were carried out, the first using five littermate pigs 13 weeks old and the second, nine littermate pigs 11 weeks old. In each test the pigs were divided into three groups on a basis of size and weight. The first groups were given each evening as much skim milk as they would consume before morning and each morning as much balanced grain feed as they would consume during the day. The pigs of group 2 were fed entirely on skim milk for periods of three days at intervals of three weeks in test one and of two weeks in test two; between the periods of milk feeding they were fed grain twice daily. The third (control) groups of pigs were fed grain ration twice daily throughout the trial. In all groups the grain ration was fed from the ground so as to increase the chances of acquisition of parasitic infestation by the animals.

The first test extended for 57 days and during this time the pigs of groups 1 and 2 made an average weight gain of 50·27 and 53 lb. respectively, whilst the control pig (group 3) gained 40 lb. during the test.

The second test extended over 98 days. Group 1 pigs gained an average of 115·5 lb. and group 2 pigs an average of 83·5 lb. whilst the controls gained 31·7 lb. The control pigs of both tests harboured *Ascaris*, *Trichuris*, *Oesophagostomum* spp., *Ascarops* and/or *Physocephalus*, and *Metastrongylus* and/or *Choerostrongylus*. All the pigs in the other groups were free from intestinal helminths, except one which carried 25 *Trichuris*. *Metastrongylus*, *Choerostrongylus*, *Ascarops*, and *Physocephalus* infestations were either absent or light in the milk-fed pigs.

The tests indicate that it is possible to keep the helminth infestation of pigs at a low level by the frequent administration of skim milk. The skim milk causes purging and its effectiveness in reducing helminth infestation seemed to depend on this action, which did not seem to be harmful to the pigs as they gained weight regularly. A low-grade enteritis observed in two pigs of group 1 and one pig of group 2 was considered of doubtful significance, as a similar condition was seen in one of the controls. The most severe limitation of the method is the large amount of skim milk which is required, amounting to as much as 8–10 gal. per animal per day.—T. E. GIBSON.

SHIKHOBALOVA, N. P. (1940–41). Immunitet pri gel'mintozakh. I. Immunitet belykh mysheĭ k superinvazii Trichocephalus muris. II. Vliyanie intensivnosti invazii na razvitie vlasoglavov y belykh mysheĭ. III. Vliyanie intensivnosti pervichnovo zarazheniya na napryazhennost' immuniteta k superinvazii belykh mysheĭ Trichocephalus muris (Schrank, 1788). **[Immunity against helminthiasis. I. Immunity of white mice to superimposed infestation with *Trichuris muris*. II. Influence of intensity of infestation on development of *Trichuris* in white mice. III. Influence of intensity of primary infestation on resistance of white mice to reinfestation with *T. muris*].**—*Med. Parazitol., Moscow.* **9.** 245–254, and **10.** 340–349 & 349–352. [French summary to part I]. **1427**

I. Although superimposed infestation was possible 20–30 days after the primary infestation, only one-eighth to one-tenth of the administered eggs developed and these worms were expelled from the host before reaching maturity. In superimposed infestation 75 days after primary infestation only one-fifth of the administered eggs developed and reached maturity in the host. The number of eggs in both primary and secondary infecting doses was 150.

II. Observations were made on mice which received *per os* various numbers of *T. muris* eggs. It was found that the percentage of eggs which developed diminished considerably when they were administered in large quantities. Although on the 20th day the number of larvae in mice which received heavy doses of eggs (500–1,000) was larger than in those which received smaller doses (50), the number of parasites which survived in the hosts throughout the experiment was approximately the same in both groups. The development and growth of individual parasites in heavily infested mice was considerably slower than in mice which were lightly infested. S. supposes that in heavy infestations, the metabolic products of the larvae inhibit their development and give rise to their premature expulsion; absorption of these products by the host's tissues also stimulates the production of a certain degree of immunity.

III. Mice infested with *T. muris* acquire a certain amount of immunity which is manifested in a lowering of the intensity of reinfestation and in premature expulsion of the parasites. Light primary infestations with 50 eggs were found to produce a considerable immunity which inhibited the normal development of parasites even at massive reinfestation with 400–600 eggs. The heavier the primary infestation, the fewer parasites reached maturity at reinfestation.—A. M.

See also absts. **1520** (helminths of Australian sheep), **1530** (immunity in calves, caecal fluke of poultry in Hawaii), **1490-1492, 1520, 1531** (anthelmintics).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

MULLIGAN, R. M. (1944). **Some statistical aspects of canine tumors.**—*Arch. Path.* **38.** 115–120. **1428**

M. summarizes the more important contributions to the literature dealing with neoplasms in the dog, from Casper (1893) to Antoine, Liégeois and Verstraete (1934). Owing to the varying nature of the material, the lack of uniformity of nomenclature, and the absence of clinical and other information it is impossible to analyse the findings quantitatively but certain general conclusions are possible. The most common age group for both benign and malignant tumours is 6–10 years. No conclusive data are available for breed incidence. Benign tumours are less common than malignant ones; icarcnoma is more common than sarcoma. Superficial and readily accessible tumours are more often recorded, probably because of the greater difficulty in diagnosing cancer of internal organs. The most commonly affected internal organs are the liver, prostate, thyroid, testis, lymph nodes and lungs.

Further large-scale study of canine tumours is needed and in this connexion it would be of advantage to establish a canine tumour registry on similar lines to those dealing with neoplasms in man. The nomenclature used for animal and human tumours should be standardized to facilitate a study of comparative oncology. The high incidence of spontaneous tumours in the dog affords ample material for study of the cancer problem in human beings.—E. G. WHITE.

BUNTING, H. (1943). **Serological studies of transplantable mouse tumor 15091a.**—*Yale J. Biol. Med.* **15.** 557–563. [Author's summary copied *verbatim*]. **1429**

1. No complement-fixing antibodies for tumor 15091a were demonstrable in sera of mice in which the tumor had failed to grow or had regressed after transplantation.

2. Rabbit anti-15091a serum reacted strongly with heterologous antigen from five spontaneous mammary carcinomas and two methylcholanthrene-induced sarcomas, irrespective of the strain of mice in which they arose; it reacted less strongly with one spontaneous carcinoma and two other induced sarcomas. No reaction was obtained with two other spontaneous mammary carcinomas.

3. Rabbit anti-15091a serum did not react with most of the antigens of various mouse organs tried—liver, kidney, brain or normal mouse serum; exceptional reactions were obtained once with brain and twice with liver.

4. The specific antigenic substance in extracts of tumor 15091a was lipoidal, being soluble in ether and alcohol.

5. The results indicate an antigenic dissimilarity between malignant mouse tumor tissue and normal mouse organs.

DMOCHOWSKI, L. (1944). **Mammary tumour inducing factor and genetic constitution.**—*Brit. J. exp. Path.* **25.** 138–140. [Author's summary copied *verbatim*]. **1430**

The results obtained in the present experiments show that the R III mammary tumour inducing factor can give rise to breast cancer in $C_{57} \times$ Strong A hybrid mice of a different genetic constitution from that of the strain from which the mammary tumour inducing factor originated. It can also induce breast cancer in this strain after transmission through two other strains of mice of different genetic constitution ("S" and S × R III).

See also absts. **1531** (spontaneous tumours in animals, avian lymphomatosis, iritis, and lymphoid tumour), **1435** (tumour of penis in a bull), **1520** (rabbit myxoma), **1513** (mitochondria), **1493** (X-ray treatment).

DISEASES, GENERAL

JUNGHERR, E., & GIFFORD, R. (1944). **Three hitherto unreported turkey diseases in Connecticut. Erysipelas—hexamitiasis—mycotic encephalomalacia.**—*Cornell Vet.* **34.** 214–226. **1431**

Three outbreaks of erysipelas, two of hexamitiasis and two of mycotic encephalomalacia are described, together with clinical and pathological observations helpful in their diagnosis. The article is illustrated by nine photomicrographs.

In turkey erysipelas, haemorrhagic lesions predominated developing primarily on a thrombotic-embolic basis. When occurring in the spleen and testis these lesions are considered pathognomonic of the disease. The pathological diagnosis was confirmed by isolation of *Erysipelothrix rhusiopathiae*.

With hexamitiasis, diagnosis was found to depend on systematic direct microscopic smears of fresh intestinal scrapings. The histological changes observed were not explanatory of the pathology of the condition.

The symptoms of mycotic encephalomalacia were similar to those of "crazy chick" disease, but unlike those of vitamin E deficiency in the chick, they were found to be due to mycotic meningitis, associated with cerebellar encephalomalacia in one case and pneumomycosis associated with toxic encephalomalacia in the other.—J. D. BLAXLAND.

CLAY, A. L. (1944). **A note on an ataxia of the horse.**—*Aust. vet. J.* **20.** 211–212. **1432**

C. reports a disease of horses of all ages and classes occurring in a small area in North Queensland. The condition has been observed for six or seven years in this area and has spread to surrounding areas to only a negligible degree. Cases are observed at all times of the year but are most common when pastures are dry or depleted. The outstanding symptom is ataxia of the hindquarters progressing to a stage where the animal has difficulty in rising and stands in a characteristic crouched posture, with the hip and stifle joints flexed. Finally the animal is unable to rise. Some impairment of vision is evident. The course varies from several days to two or three weeks, the animals usually being destroyed. A change to better pasture is often beneficial and when recovery occurs it is usually complete, though relapses may occur. Horses introduced from outside areas have become affected in three to five weeks; one horse moved out of the area, recovered completely in four days. Searching autopsies have failed to reveal any significant findings.

C. doubts whether the condition is infectious or whether poisonous plants or the scrub tick (*Ixodes holocyclus*) are involved.—D. C. BLOOD (AUSTRALIA).

HJÄRRE, A., & WRAMBY, G. (1943). Ueber die fibrinöse Serosa-Gelenkentzündung (Glässer) beim Schwein. [**Acute polyarthritis and serositis in pigs**].—*Z. InfektKr. Haustiere.* **60.** 37–64. **1433**

GLÄSSER (1910) described a disease of pigs characterized by fibrinous inflammation of the serous membranes and/or joint cavities. The condition has been called Glässer's disease, infectious polyarthritis, acute polyarthritis and serositis, "*fibrinöse Serosa-Gelenkentzündung*", and "*Transportkrankheit*". GLÄSSER also described as a separate disease the "enzootic pneumonia" of pigs, later shown by KÖBE to be due to a virus acting with a haemophilic organism ("*Ferkelgrippe*"), and now known to be similar to swine influenza as described by SHOPE in America.

It has been noted that arthritic disease has a tendency to occur after transport of young pigs. GLÄSSER suggested as the cause of the condition the "serosa-bacillus", which later workers, including the present authors, believe to be a form of *Haemophilus influenzae-suis*. SHANKS [*V. B.* **10.** 461] recovered *H. influenzae-suis* from similar cases.

The present authors found inflammation of the meninges, and sometimes of the c.n.s., in 85% of 160 cases and also often found lung lesions identical with those seen in swine influenza. From their cases, they isolated organisms indistinguishable from *H. influenzae-suis*, and with one strain they reproduced the condition in young pigs.

The swine influenza described in America, Germany and elsewhere appears to be a single entity.
—E. COTCHIN.

*MENTZEL, H. (1940). Untersuchungen über die Unfruchtbarkeit der Rinder in ihrer Beziehungen zum Lebensalter, Zuchtalter und zur Fütterung. [**Infertility in cattle in relation to age, breeding and feeding**].—*Inaug. Diss., Hanover.* pp. 23. [Abst. from abst. in *Schweiz. Arch. Tierheilk.* **85.** 42–43. (1943)]. **1434**

The author suggests the use of "sterility coefficients" as a measure of fertility in dairy herds, these

being the average number of matings necessary to produce conception (as estimated by normal parturitions plus abortions). As increases in the amount of sterility in a herd increase the coefficient, its use is suggested as a means of expressing the fertility of herds in numerical form. According to the author, as the age of cattle increases from 2 to 13 years, the sterility coefficient rises from 1·04 to 4·0. The age at first mating is also claimed to have an effect on the subsequent appearance of sterility, the most favourable breeding ages being 19–21 months and 28–30 months. It is also suggested that a preponderance of imported foods or a very high calorific diet will increase the sterility coefficient to 4 or 5. No data are given by which the author's claims may be judged.—A. ROBERTSON.

BOYD, W. L., & ANDBERG, W. G. (1944). **Infertility in bulls.**—*Cornell Vet.* **34.** 370–375. **1435**

Five bulls were affected with varying degrees of infertility and the authors report the results of treatment of three in an effort to increase their reproductive efficiency. In one case, which involved removal of a tumour growth from the glans penis, treatment was successful. The other two treated cases, where ascorbic acid therapy was used to stimulate spermatogenesis, gave negative results in one case and only partial success in the other.—A. ROBERTSON.

*TER BORG, H. (1943). **[Enzootic sterility in cattle].** —*Tijdschr. Diergeneesk.* p. 40. [Abst. from abst. in *Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* **52/50.** 75. (1944)]. **1436**

The author deals with a form of sterility in cattle associated with a catarrhal inflammation of the female genital tract. The cause is assumed to be a streptococcus which has been isolated from cervical secretions and also from semen and is thought to be transmitted during coitus. Up to 90% of affected animals come into heat normally and clinically there is little to be seen save transient changes in the cervical region.
—A. ROBERTSON.

LE COMPTE, P. M. (1944). **Effect of sex hormones on nephrotoxic nephritis in the rat.**—*Yale J. Biol. Med.* **16.** 627–638. [Author's summary copied *verbatim*]. **1437**

Nephritis was induced in rats by means of a rabbit antiserum directed against rat kidney. Those rats which were given either estradiol or testosterone in addition to the serum had, as a rule, larger kidneys and more severe lesions than did rats receiving serum alone or the hormones alone. The renal enlargement seemed to be due in large part to hypertrophy and especially hyperplasia of the epithelium of the surviving convoluted tubules. No evidence of a beneficial effect of either hormone on the course of disease or the renal lesions was apparent.

MITMAN, M. (1945). **Aerial infection.**—*Brit. med. J.* Jan. 20th. 71–74. **1438**

Following up the theory that smallpox may be spread by air-borne particles M. deals with aerial infection in more general terms. He suggests that whilst human pathogens might be carried over long distances in the form of partially dried droplet nuclei, the fact that they are not recovered from the upper air infers that in the open they are soon inactivated.

In confined spaces, on the other hand, too little attention has been paid to the danger of such particles. M. considers that the tendency to exclude droplet infection over distances of more than four feet from the source of expulsion is not warranted. Various experiments are quoted showing the effects of coughing, sneezing etc. in spreading particles over wide areas. The control of air-borne infection especially in confined spaces is difficult. The various measures which have been advocated such as ultra-violet irradiation of air, treatment of bedding and floors, use of masks etc. are discussed.—R. E. GLOVER.

See also absts. **1519** (livestock diseases in Canada), **1520** (in Australia), **1522** (in Eire), **1524** (in Cyprus), **1527** (in Bechuanaland), **1530-1532** (in the U.S.A.), **1525** (pig diseases in the Gold Coast), **1531** (periodic ophthalmia, "wobbly" horses), **1442** (urinary calculi in sheep), **1520** (balanitis in sheep), **1534** (constitutional pathology).

NUTRITIONAL AND METABOLIC DISORDERS

PHILLIPS, P. H. (1942). **Nutrition and reproduction of farm animals. Third Report of the Committee on Animal Nutrition of the National Research Council.**—*Repr. nat. Res. Coun., Wash.* No. 112. pp. 8. **1439**

This is a short summary of the present knowledge of the relation of nutrition to reproduction. Thirty-three references to original papers dealing with the nutritive requirements for reproduction are cited, most of which have already been dealt with in the *Bulletin.*
—N. J. SCORGIE.

HOWE, P. E., HARSHAW, H. M., & WOODWARD, T. E. (1943). **A handbook for better feeding of livestock.** —*Misc. Circ. U.S. Dep. Agric.* No. 12. pp. 71. [Revised Edit.]. **1440**

This handbook, intended primarily for farmers in the U.S.A., covers generally the principles of the practical feeding of all classes of livestock, including poultry. A series of reference tables sets forth the size and capacity of silos in relation to the number of cattle to be fed, the percentage composition of animal feeding stuffs, and the amounts of concentrates per milk yield that should be given to cows not on pasture.—N. J. S.

—, (1941). **[Discussion on] Nutrition of cattle and the fodder problem in India in relation to the human food problem.** [Speakers :– LANDER, P. E., AYKROYD, W. R., AIYER, A. K. Y. N., BHARUCHA, F. R., BOYD, H. J. H., & SIVAN, M. R. R.]—*Proc. 27th Indian Sci. Congr., 1940.* Pt. IV. pp. 141–148. **1441**

LANDER remarked that problems of animal and human nutrition and welfare are closely related. In India, a vast amount of disease and ill-health is directly due to malnutrition, which is closely related to agriculture. The soil is ultimately the origin of all human and animal welfare, since soil quality usually determines crop quality. Hence, the discovery of soil defects and economic remedial measures are essential. A systematic crop analysis, the compilation of adequate human dietaries, the reorganization of agricultural practice, and surveys covering malnutrition and human dietary are required. LANDER referred to osteomalacia and widespread malnutrition in the people of Kangra valley (Punjab). The osteomalacia seems to be due to inadequate dietary Ca, together with vitamin A and C deficiency. The existence of similar malnutrition in other parts of India may be assumed. The true position must be ascertained.

AYKROYD, speaking of nutritional disease in Kangra, said that as the diet in this area is not very different from that of other parts of India, and as the Ca and P values of foodstuffs from Kangra do not differ from those of similar foodstuffs in the south, the hypothesis that the high incidence of rachitic diseases in Kangra is due to abnormally low Ca and P in the Kangra valley

foodstuffs must be eliminated. The important factor is probably sunshine.

AIYER recommended an extension of mixed farming, especially in the Punjab. BHARUCHA stressed the importance of synthetic fertilizers in overgrazed areas, to overcome the grass shortage.

—B. N. MAJUMDAR (INDIA).

NEWSOM, I. E., TOBISKA, J. W., & OSLAND, H. B. (1943). **The effect of rations on the production of urinary calculi in sheep.**—*Tech. Bull. Col. agric. Exp. Sta.* No. 31. pp. 42. **1442**

In attempts to incriminate the causal agent or agents of urinary calculi, lambs, were fed for considerable periods on varied rations. Detailed chemical studies were also carried out periodically on the urine. Although no definite conclusions could be drawn from the vast mass of experimental data it appeared that a ration comprising cane fodder, bran and white maize was more liable to produce urinary calculi than one containing lucerne or beet tops and yellow maize. Such a ration as the former is characterized by a low vitamin A content and a narrow Ca : P ratio, requires little water consumption and results in a small output of urine. The urine of lambs on this ration is more nearly neutral, low in total solids and specific gravity, and on standing tends to precipitate out a larger amount of insoluble matter. There was some indication, although far from conclusive, that calculi may be formed on a ration with adequate amounts of lucerne supplemented by a mineral mixture containing excessive amounts of the carbonates of calcium and magnesium.—A. EDEN.

HAMMOND, J. C. (1944). **Lack of water a cause of loose, slimy gizzard linings accompanying early mortality in poults.**—*Poult. Sci.* **23.** 477–480. **1443**

In experiments to ascertain if a dietary factor was involved, H. used four groups, each consisting of 20–25 poults ; the condition occurred in birds which were deprived of water for periods up to 96 hours after hatching. Such birds did not then start to feed properly between the 5th and 12th day after hatching. Moderately severe losses occurred in turkey chicks and it was found that the gizzard linings of the affected birds were loose and slimy. The authors consider that it is important to ensure that poults actually eat and drink in the early period after hatching.—J. D. BLAXLAND.

CASKEY, C. D., NORRIS, L. C., & HEUSER, G. F. (1944). **A chronic congenital ataxia in chicks due to manganese deficiency in the maternal diet.**—*Poult. Sci.* **23.** 516–520. **1444**

Experiments were conducted in which the eggs from hens fed a manganese-deficient basal diet were hatched and the incidence of ataxia in the chicks observed. The basal diet contained 6·3 μg. manganese per g. and manganous carbonate was added to experimental diets to provide a manganese content ranging from 20 μg. to 100 μg. per g. Ataxia was observed almost entirely in the chicks hatched from the eggs of the hens fed the basal diet containing 6·3 μg. Mn per g. Although the hatchability of the eggs of the hens fed 20 μg. Mn per g. was somewhat below normal, only three ataxic chicks were observed in those which hatched. There was no typical ataxia in the chicks hatched from eggs of hens fed diets containing higher amounts of Mn. The ataxia which usually occurred was a tetanic spasm of the opisthotonic type but occasionally the spasms were of the emprosthotonic or pleurosthotonic type. Histological examination of the brains of the ataxic chicks showed no lesions, but both the lipoid and the total P contents of the brains were less than in the brains of normal chicks. The phosphatase content was also slightly reduced but no detailed data are given for these constituents.

The ataxia became somewhat less evident as the chicks became older but recovery was not complete at maturity. The offspring of ataxic males and females were not ataxic and developed normally, thus indicating that the development of the ataxia was not due to an hereditary factor.—R. ALLCROFT.

ANDERSON, A. J. (1942). **Molybdenum deficiency on a South Australian ironstone soil.**—*J. Aust. Inst. agric. Sci.* **8.** 73–75. **1445**

The application of wood ashes to the pasture in certain ironstone soil regions of South Australia resulted in improvement in sown pastures. Trials showed that molybdenum was the critical factor responsible. Top-dressing with 1–2 lb. ammonium molybdate per acre produced remarkable responses in pastures of subterranean clover, perennial rye grass and *Phalaris tuberosa*.—H. McL. GORDON (AUSTRALIA).

NESTLER, R. B. (1943). **Effect of large quantities of common salt in the diet of bobwhite quail.**—*J. Wildl. Mngt.* **7.** 418–419. **1446**

Four tests were carried out during investigation in connexion with the use of sodium chloride for the control of cannibalism. Adult birds out of production, breeding birds, and day-old chicks were used. Some bobwhite quail chicks were found to be able to stand salt levels as high as 6 or even 8% for two weeks. Mortality as a result of salt poisoning increased in chicks where the salt content exceeded 4% for the two weeks but with adults there was no mortality up to a 6% level. 2–3% salt in the diet appeared to check outbreaks of " picking ", but in one experiment a salt level of 4% did not prevent it entirely. Differences in egg production and fertility between groups of breeding birds on salt levels of 0·5 and 2% were not significant. Hatchability of fertile eggs was better on the higher salt level.

—J. D. BLAXLAND.

KRESTIN, D. (1945). **The prophylaxis of rickets by single massive doses of vitamin D.**—*Brit. med. J.* Jan. 20th. 78–80. **1447**

The results of prophylaxis of rickets in children over a six months' period from autumn to winter and early spring, following a single massive dose of vitamin D_2 given orally (7·5 mg. or 300,000 I.U.) compared favourably with those in children given Ministry of Food cod liver oil at the usually recommended dosage and frequency, and with untreated controls. Possible advantages and disadvantages of the single massive dose method are discussed ; no ill effects attended the dosage. In special cases, mentioned in the text, this dosage may be doubled with advantage, and, if necessary, repeated at shorter intervals.—A. EDEN.

JONES, J. H. (1944). **The production of hypercalcemia with small amounts of vitamin D.**—*J. Nutrit.* **28.** 7–16. **1448**

The inclusion of one I.U. of vitamin D_2 or vitamin D_3 in a diet very low in P and high in Ca produced a pronounced hypercalcaemia in rats. Dihydrotachysterol (A.T. 10) was much less effective. The degree of hypercalcaemia was dependent on the amount of Ca in the diet, and the inhibition of growth which was observed was in turn dependent on the degree of hypercalcaemia. Calcification was greater in the animals exhibiting a definite increase in serum Ca. The observations confirmed the view that vitamin D increases the absorption of Ca from the intestines.—E. M. C.

VAN WAGTENDONK, W. J., SCHOCKEN, V., & WULZEN, R. (1944). **A dietary factor, essential for guinea pigs. II. A comparative study of the creatine excretion of**

animals on a diet deficient in this factor and in vitamin E.—*Arch. Biochem.* **3.** 305–310. [For Part I, see *V. B.* **14.** 25]. **1449**

G. pigs receiving a diet containing vitamin E but deficient in the anti-stiffness vitamin increased steadily in weight over the experimental period of 97 days and showed no signs of dystrophy, or significant increase in creatine excretion, but marked stiffness of the carpal joints developed. On a diet devoid of vitamin E, but containing a crystalline preparation of the anti-stiffness vitamin, the carpal joints were normal, but muscular dystrophy accompanied by creatinuria was observed. Live weight decreased slowly over the experimental period. Animals on a diet deficient in both factors showed a greater degree of carpal stiffness and muscular dystrophy than was produced by a deficiency of either factor individually. The addition of cod liver oil to a diet deficient in either of the factors accelerated the onset of the deficiency symptoms, without having any toxic effects.—E. M. CRUICKSHANK.

FEHILY, L. (1944). **Human-milk intoxication due to B_1 avitaminosis.**—*Brit. med. J.* Nov. 4th. pp. 590–592. [Author's summary copied *verbatim*]. **1450**

It is suggested that the term " breast-milk intoxication " or " human-milk intoxication " be substituted for the term " infantile beriberi ".

It is also suggested that in addition to methylglyoxal, hitherto considered to be the only toxic factor in the milk of B_1-avitaminotic women, other intermediary metabolites, in concentration encountered in the milk, may play an important part in human-milk intoxication.

The action of these intermediary metabolites appears to be synergic and cumulative.

The symptoms of human-milk intoxication are discussed.

It is pointed out that accumulation of intermediary metabolites in the milk of lactating women may be encountered in conditions other than B_1 avitaminosis and thus cause an intoxication.

MILLS, C. A. (1943). **Environmental temperatures and B-vitamin requirements: riboflavin and pyridoxin.**—*Arch. Biochem.* **2.** 159–162. [For previous article, see *V. B.* **13.** 396]. **1451**

It was found that the growth requirements of the rat for riboflavin, vitamin B_6, inositol and *p*-aminobenzoic acid were the same at 90–91°F. as at 68°F.

—ALASTAIR N. WORDEN.

ZILVA, S. S. (1944). **An evaluation of the vitamin-C position.**—*Brit. med. Bull.* **2.** 217–219. **1452**

A critical review is given of the use of ascorbic acid in clinical studies and of methods of determining vitamin C status in human beings.—A. M. COPPING.

See also absts. **1530** (vitamin research), **1435** (vitamin C and fertility), **1426** (anthelmintic value of skim milk for pigs), **1386** (growth factor for bacteria), **1520** (mineral deficiency, " peg leg " in cattle, enzootic, ataxia in sheep, bovine haematuria), **1531** (perosis, Mn in cattle and poultry, vitamin A in calves, dairy cattle, and goats, vitamin needs of pigeons, rats, rabbits, g. pigs, and chicks).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

RAY, S. C. (1942). **Phosphatase in faeces.**—*Indian J. vet. Sci.* **12.** 241–248. **1453**

Results are given of a preliminary study of the excretion of faecal phosphatase in four normal goats under different physiological conditions—non-lactating adult, non-lactating growing, and lactating adult animals and of the effect of a prolonged fast on such excretion.

Under normal metabolic conditions, the animals excreted a significant amount of phosphatase (average 23 units per g. of dry matter) and this dropped considerably during a prolonged fast (5·1 units). Amongst the normal animals the intensity of excretion of phosphatase per kg. of body weight was significantly higher (160 to 185 units) in lactating and in growing animals than in non-lactating adult animals (120 units).

—A. K. PAL (INDIA).

WILLIAMS, W. L. (1941). **The effect of non-suckling and the non-removal of milk upon individual mammary glands in the lactating mouse.**—*Yale J. Biol. Med.* **14.** 201–208. [Author's summary copied *verbatim*]. **1454**

Non-suckling of certain glands caused a greater diminution of secretory activity in the glands concerned than did suckling without milk removal. Some of the obstructed glands (4 out of 16) showed severe intraglandular stasis, inflammation, and necrosis. In the majority, however, secretion diminished to approximately a parturitional level and the parenchyma underwent no further involution. The unsuckled glands showed little or no intraluminal congestion with retained secretion and no inflammatory lesions. Secretion and parenchymal maintenance were in all cases at a subparturitional level after 3 to 5 days of non-suckling of the gland or glands in question. The alveolar cells were at first tremendously engorged and later degenerated. The stimulus of suckling appeared to be necessary for the release of secretory products by the alveolar cells.

COLLIER, H. B. (1944). **The standardization of blood haemoglobin determinations.**—*Canad. med. Ass. J.* **50.** 550–552. **1455**

The author comments on the inadequacy of the methods commonly employed for the determination of blood haemoglobin and describes four methods for conducting determinations, *i.e.*, the total iron, pyridine haemochromogen, alkaline haematin, and cyanmethaemoglobin methods. He states that the iron method gives absolute values for Hb ; the pyridine haemochromogen method also gives absolute values when calibrated with pure haemin as a standard. These two procedures are, however, too involved for routine Hb determinations but are very suitable for accurate standardization. Both the alkaline haematin and the cyanmethaemoglobin method are useful for routine determination of total pigment. The latter method is preferred for simplicity and rapidity.—THOS. MOORE (CANADA).

CHAMBERS, R., & ZWEIFACH, B. W. (1944). **Topography and function of the mesenteric capillary circulation.**—*Amer. J. Anat.* **75.** 173–205. **1456**

The experiments carried out by the authors have demonstrated the arrangement of muscular elements within the capillary bed of the mesentery in the dog and rat, which, it is suggested, are capable of controlling the rate and flow of blood through the part.

Briefly, the capillary bed is formed as follows. Apart from the usual short arterio-venous anastomoses, longer capillary-like central channels pass from arteriole to venule. The proximal portion of this channel is known as the metarteriole. The true capillaries arise as loops from this central channel and the origin of the capillary loop is known as the pre-capillary sphincter. Muscular elements in the capillary bed proper are limited to the metarteriole and precapillary sphincters and it is the recurrent vasomotion of these vessels which controls the rate of blood flow in this area. The action

of epinephrine and histamine upon this circulation is described.—C. W. Ottaway.

Hilder, R. A., Fohrman, M. H., & Graves, R. R. (1944). **Relation of various factors to the breeding efficiency of dairy animals and to the sex ratio of the offspring.**—*J. Dairy Sci.* **27.** 981–992. **1457**

The breeding records, extending over a period of about 26 years, of the herd of the U.S. Bureau of Dairy Industry were studied from the standpoint of breeding efficiency as influenced by the ages of the cows and bulls and by the season of the year. The sires showed a gradual lessening of breeding efficiency with advancing age, with the exception of the seven-year-old group. Heifers being bred for the first time required more services than the older cows; apart from this, age had little apparent effect upon the breeding efficiency of the females. Bulls over five years of age showed a distinctly higher number of services per conception than did young bulls when mated to virgin heifers. The breeding efficiency of the cows was not appreciably affected by the length of calving interval. The most noticeable effect of season on breeding efficiency was the relatively larger number of services required for conception during midsummer, followed by a sharp decrease in the autumn; there was also an increase in the number of services per conception during February and March. Data showing the yearly variation in breeding efficiency indicate that there was a tendency for this to be lowest following years when the percentage of abortions was highest. A tabulation of the complete breeding life-histories of 725 cows in the Beltsville herd indicates the probable breeding losses in a dairy herd from various causes. Culling for low production was not practised. The breeding-records of these cows are an indication of the number of replacements that must be made to maintain a dairy herd. For example, only 449 of the original 725 cows, or 61·9%, were bred for the third calf, and only 393 of these conceived for the third time. There was no evidence that any of the factors studied influenced the sex ratio of the offspring.
—N. J. Scorgie.

Kelley, R. B. (1943). **The length of gestation periods preceding single and multiple births in sheep.**—*Aust. vet. J.* **19.** 43–45. **1458**

Among Dorset Horn and merino ewes there was no difference in the length of gestation periods preceding single and multiple births. The mean length of gestation periods for merino ewes was greater than that for Dorset Horn ewes.
—H. McL. Gordon (Australia).

Edwards, J., & Ritchie, J. N. (1944). **A report on artificial insemination in the United States submitted to the Agricultural Improvement Council.** pp. 19. Cambridge: University Press. [4to] **1459**

This report by two British authors was compiled after a tour of some of the artificial insemination centres in the United States; they also visited a number of laboratories where research in this subject is being actively pursued. The authors describe the different types of artificial insemination organizations operating in the U.S.A. and attempt to assess the factors making for their success or failure. Attention was also given to the technical aspects of artificial insemination work; the techniques in common use and the management of the bulls at the centres visited are outlined. Other items in the report include developments in the dilution of semen, blood-typing for parentage tests, regulations and the breed societies, personnel and the control of disease.—N. J. Scorgie.

Bartlett, J. W., & Perry, E. J. (1944). **Rental rate plan for bulls used in artificial insemination.**—*J. Anim. Sci.* **3.** 283–286. **1460**

The bulls used by the New Jersey Cooperative Artificial Breeding Unit are the property of Rutgers University Dairy Research Station. A lump sum is paid for each "acceptable semen sample". It is not made clear whether this means a total ejaculum, or a quantity of diluted semen sufficient to inseminate one cow.

For unproved bulls, the basic rate per sample is fifty cents for yearlings, with a twenty-five cent annual rise to a maximum of one dollar and fifty cents for a five-year-old. The average butter-fat records of the sire's daughters, dam, and dam's daughters are determined, and compared with the breed average (recorded by the breed society), for that age and class of animal, a supplementary rate of one cent being paid for every percentile by which this exceeds the corresponding breed average. Thus if the quotient, female relative fat average over corresponding fat average for breed, comes to 1·1, the supplementary charge works out at ten cents.

When a bull has five daughters which have completed a lactation, he becomes a proved bull. The basic charge is raised to three dollars per sample, and a supplement of ten cents is allowed for each percentile by which the average yearly fat record of the daughters exceeds the breed average in that age and class.

[No account is taken of total milk yields of the female relatives.]—F. L. M. Dawson.

Tobin, C. E. (1944). **Effect of gonads and adrenals on the absorption of subcutaneous sesame oil.**—*J. Lab. clin. Med.* **20.** 850–852. [Author's conclusions copied *verbatim*]. **1461**

The rate of absorption of sesame oil from rats is reduced by removal of the ovaries, removal of the adrenals in addition to the gonads, and by pregnancy. The sesame oil was injected subcutaneously in 1 c.c. amounts and recovered later as an ether-soluble extract of the injection sites.

Mixner, J. P., Meites, J., & Turner, C. W. (1944). **The stimulation and inhibition of milk secretion in goats with diethylstilbestrol.**—*J. Dairy Sci.* **27.** 957–964. **1462**

In the experiments cited, the relation was established between lactation-stimulating and lactation-inhibiting dosages of diethylstilboestrol. A daily dose of 0·25 mg. diethylstilboestrol constituted a lactation-stimulating dosage in nonparous goats while dosages of 1–4 mg. per day were progressively lactation-inhibiting in lactating goats.—N. J. Scorgie.

Roberts, H. K., Helwig, E. B., Elman, R., & MacBryde, C. M. (1944). **Serial biopsy studies of the effects of estrogens on the liver. Chemical and morphologic responses to diethylstilbestrol and estradiol.**—*J. Lab. clin. Med.* **29.** 1062–1069. [Authors' summary and conclusions copied *verbatim*]. **1463**

1. Hepatic glycogen, fat and nitrogen as determined by chemical analysis of biopsy specimens showed no significant alteration following the administration to dogs of diethylstilbestrol dipropionate or of alpha estradiol dipropionate. 2. The histologic estimation of the amount of hepatic fat could be only approximately correlated with the chemical analyses. 3. Morphologic changes such as hydropic or fatty degeneration of the liver, which we have previously found in dogs receiving large doses of synthetic or natural estrogens, were not observed in this study. This may be explained by the absence of the profound blood changes previously induced.

KINGSBURY, B. F. (1944). **Tonsillar epithelium and the lymphocyte: An examination of the palatine tonsil of the cat.**—*Amer. J. Anat.* **75.** 233–261. **1464**

The origin and nature of the lymphocytic cells within the tonsillar epithelium are described, and also, in so far as it is associated with this investigation, the fate of the blood and tissue lymphocytes. It is suggested that these tonsillar cells are formed in the sub-epithelial lymphatic tissues surrounding the lymph nodules. Changes, interpreted as degenerative, are noted in these cells in their passage through to the superficial layers and to the adjoining crypts. Marked migration of polymorphonuclear neutrophilic leucocytes was not observed. The source and nature of the co-called salivary corpuscles are discussed.—C. W. OTTAWAY.

VAN DYKE, J. H. (1942). **The pharyngeal complex IV and its relation to the thyroid gland in mammals with particular reference to man and sheep.**—*Cornell Univ. Abstr. Theses, 1941.* pp. 306–309. **1465**

Structures which arise during embryonic life from the fourth pharyngeal pouch (parathyroid, thymus, and branchial bodies, designated the pharyngeal complex IV) are partially incorporated within the growing thyroid. Serial sections of thyroid tissue were made to determine the fate of these bodies. In the human embryo, thymus IV was found from about the fifth foetal month. In sheep, the ultimobranchial body fails to undergo complete degeneration and persists in the adult as solid-cell remnants or as epithelial cysts which may assume a pathological aspect. Examination of these cysts revealed two types of cell: a small densely staining cell and a clear glandular cell with a large nucleus that was moderately stained. These cells migrate from the cyst wall, the former forming atypical thyroid-like follicles and the latter typical vesicles which compose a part of the gland.—C. W. OTTAWAY.

GHETIE, V., & JORGULESCU-MICLEA, P. (1943). Die Anatomie der Schwanzgegend bei Bos (Bubalus) bubalis L. domesticus var. Europaeus. **[The anatomy of the tail region in the European domestic buffalo].**—*Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* Nov. 12th. 393–397. **1466**

This is an account of the anatomy of the tail of the buffalo given chiefly for comparison with that of the ox. The European buffalo's tail is flat at the root but becomes more cylindrical as it approaches the tip, and movement is free. The muscles are very well developed and the attachments of many of them are associated with synovial sheaths and even synovial bursae.

Osteological development is in keeping with this general outline. The sacrum consists of four segments only; it is more triangular, higher and shorter than that of the ox. The anterior coccygeal vertebrae carry large transverse processes, which give an impression of greater width in this region.

Line diagrams assist the detailed descriptions which are given of these features.—C. W. OTTAWAY.

See also absts. **1515** (blood transfusion), **1434** (bovine sterility), **1514** (sterility test), **1439**, **1528**, **1529** (nutrition and fertility), **1437**, **1528**, **1529** (sex hormones), **1530** (vitamins in bovine physiology), **1531** (thyroxine and lactation, fertility, freezing and anaerobiosis of sperms, lactogenic hormones, oestrous cycle in mares, Ca metabolism of laying hens).

POISONS AND POISONING

BARRAT, E. (1943). Empoisonnement des bovidés par l'arséniate de chaux. **[Poisoning of cattle by calcium arsenate].**—*Bull. Acad. vét. Fr.* **16.** 18–23. **1467**

B. reports a case of arsenical poisoning in heifers which had accidentally been given access to potato tops heavily sprayed with calcium arsenate as a protection against the potato beetle. The symptoms included dullness, inappetence, muscular twitchings and a violent and persistent diarrhoea. Treatment consisted of giving the affected animals milk, accompanied by injections of caffeine. Of five animals affected, all made uneventful recoveries except one which grew progressively worse and was killed *in extremis* a fortnight later. P.M. examination showed extensive lesions in the abomasum with a profuse serogelatinous exudate lying under the mucosa, accompanied by lesions in the kidneys and liver typical of arsenical poisoning.—A. EDEN.

FLETCHER, J. M. (1944). **Bracken poisoning in cattle.**—*Vet. Rec.* **56.** 478. **1468**

Two types of bracken poisoning may be encountered in practice, *viz*, the enteric type, by far the more common, which is characterized by high temperature and marked enteritis with clots of blood appearing in the faeces, and the laryngeal type, with swelling in the throat region, which is associated with roaring and difficulty in breathing, with high temperature. Prognosis is grave and the more usual P.M. findings are those of haemorrhagic enteritis, with petechiae in the lungs, heart, pleura, peritoneum and liver, often with intense subpleural and subperitoneal haemorrhages. It has been suggested that poisoning may be due to specific toxic principles in the bracken itself or to its irritant action on the bowel, allowing the entrance of bacteria, particularly pasteurella, which give rise to the actual symptoms of the disease. To this F. adds the third suggestion, without much convincing evidence, that the disease is connected with a Ca deficiency in the system. Although old or withered bracken is regarded as the more toxic, cattle may be affected in the early summer and some possible reasons for this are suggested.—A. E.

JOHNSTONE, I. L., & ALLEN, G. H. (1944). **Observations on the poisoning of sheep by *Myoporum deserti* (turkey-bush or ellangowan-bush).**—*Aust. vet. J.* **20.** 227–230. **1469**

The authors report feeding *Myoporum deserti* to two sheep experimentally, in an investigation of heavy mortality in sheep travelling on a stock route in S.W. Queensland. Actual conditions at the time the losses occurred were closely duplicated in the trial and both sheep died in 48 hours after presenting the exact syndrome described in the original outbreak.

Symptoms observed were drowsiness, lowering of the head and arching of the back, a low body temperature, and deep respirations. Later, the sheep collapsed, became semi-comatose and would not rise. Oedema of the mandibular region and jaundiced membranes were observed some time before death. Blood non-protein nitrogen remained normal but an intense hypoglycaemia occurred in the later stages. The ingestion of water several hours after the ingestion of the plant caused considerable exacerbation of the symptoms. The main findings at autopsy in both sheep were severe jaundice, excess amber-coloured fluid in the body cavities, port wine-coloured urine, stasis of the lower bowel and haemorrhage of most serous and mucous surfaces. Marked acute, recent, degenerative changes were present in the liver.—D. C. BLOOD (AUSTRALIA).

HUDSON, J. R. (1944). **Notes on animal diseases. XXIV. Plant poisoning.**—*E. Afr. agric. J.* **10.** 101–108. **1470**

After a brief survey of those factors affecting the incidence of plant poisoning in East Africa, the author

deals in detail with those plants known to have caused losses under natural conditions. In this category are placed the following: *Phytolacca dodecandra, Ricinus communis, Dichapetalum stuhlmanni, Elaeodendron keniense, Rhoicissus erythrodes, Turraea robusta, Melia azederach, Stephanorossia palustris, Agauria salicifolia* var. *pyrifolia, Acokanthera friesiorum, A. longiflora,* and *Senecio ruwenzoriensis.* Poisoning by prepared foodstuffs is considered, and in a final section a list is given of plants which have been shown by experiment to contain toxic principles, but where evidence is lacking as to toxicity under natural conditions.—H. PAVER.

DURRELL, W. B. (1944). **Food poisoning in foxes.**—*Canad. J. comp. Med.* **8.** 103–104. **1471**

D. describes an illness marked by frothing at the mouth and champing of the jaws with the development of nervous prostration. Twenty foxes were affected and five died on a ranch of 200. Feeding of the carcass of a cow which had died suddenly had commenced the night previously and it was suspected as being the source of infection. However, P.M. examination and laboratory tests failed to confirm this suspicion. Further investigation showed that all the sick animals had been moved to new pens just the day before and had eaten a lot of tall frozen grass. Only the sick foxes had eaten this grass whereas all foxes had partaken of the meat; this fact, together with the negative laboratory findings, led the author to suggest the grass as the cause of the illness. —J. L. BYRNE (CANADA).

BURTON, H. A. (1944). **Mushroom poisoning in cattle.** —*Vet. med.* **39.** 290. **1472**

This is a brief clinical report on an outbreak of poisoning in cattle attributed to mushrooms, of which there was rank growth induced by heavy rains following a period of drought. A characteristic symptom was a highly inflamed rectum with painful defaecation. Temperatures were normal and appetite good. Two deaths occurred.

[In this short note the word "mushroom" is used without indication of what genus or species was concerned. This is most unfortunate as little is known about the toxicity of the larger fungi for domesticated animals.]—H. PAVER.

WELCH, H., PRICE, C. W., NIELSEN, J. K., & HUNTER, A. C. (1944). **The acute toxicity of commercial penicillin.**—*J. Lab: clin. Med.* **29.** 809–814. [Authors' summary and conclusions copied *verbatim*]. **1473**

A study of over 300 lots of penicillin sodium produced by fourteen manufacturers showed all to pass the mouse safety test. There is a wide variation in the acute toxicity of different manufacturers' products. Some products are lethal for mice in concentrations of 3,500 to 5,000 units while one manufacturer is producing penicillin sodium lethal only at doses of 25,000 to 32,000 units.

A comparison of commercial samples of penicillin calcium and penicillin sodium made from a single master lot showed the calcium salt to be by far the more toxic preparation. The greater toxicity of the calcium over the sodium salt of penicillin should not discourage its clinical use in man. The toxicity of the penicillin calcium is primarily due to the cation. The toxicity of high potency samples of penicillin magnesium is primarily due to the cation used in producing these preparations. Similarly, the cation contributes substantially to the toxicity of penicillin ammonium.

See also absts. **1530**, **1531** (lead arsenate), **1531** (fluorine, selenium), **1446** (salt poisoning in bobwhites), **1432** (poison plants in ataxia of horses), **1530** (*Nolina texana*), **1531** (lichen), **1494**, **1495** (snake and scorpion venoms), **1490** (toxicity of phenothiazine).

PHARMACOLOGY, THERAPEUTICS AND DISINFECTION

LANGDON-BROWN, W. (1945). **The evolution of modern therapeutics.**—*Brit. med. J.* Jan. 13th. 35–38. **1474**

The author reviews progress in therapeutics: in the last 40 years greater advances have been made than in all the preceding centuries. We have passed away from the ancient mixture of empiricism and magic, by way of pharmacology, to a biological and indeed a biochemical approach. The recognition of deficiency diseases, the hormonal theory of nerve transmission, chemotherapy, the endocrine glands, and psychological aspects of disease are especially picked out for discussion. Little is said about the part now being played by the synthetic chemist.—J. M. ROBSON.

GADDUM, J. H. (1944). **The administration of drugs.** —*Edinb. med. J.* **51.** 305–319. **1475**

The general principles of the distribution of drugs in the body are discussed, drugs being divided into four classes according to their volume of distribution. The mechanisms by which drugs accumulate are described. The author describes the more important methods by which drugs are given (intravenously, by injections to form depots, and by application to the skin and mucous membranes, to the respiratory tract, and to wounds). The author emphasizes that, though some of the methods are traditionally associated with a particular drug, there is no reason why other drugs should not be given in the same way. The discovery of the proper way of using a new therapeutic weapon may turn an academic observation into one of real practical benefit. —J. M. ROBSON.

MUTCH, N. (1944). **Inhalation of chemotherapeutic substances.**—*Lancet.* **247.** 775–780. [Author's summary copied *verbatim*]. **1476**

Quantitative details are given of the fate of sulphonamides inhaled as mists formed from their aqueous solutions. Sulphonamide EOS and soluble sulphacetamide were used. Mists were produced by the Collison inhalation apparatus. Various devices were substituted for the standard oronasal face-piece and their relative efficiencies estimated. The constants of the apparatus were measured and biological data are given for patients with bronchiectasis and for normal controls. The importance of eliminating air turbulence in the external air conduits and in the mouth has been demonstrated.

When a 50% w/v aqueous solution of sulphonamide EOS, nebulized by 6–8 litres of oxygen per minute, is inhaled through a small rubber nose-mask, the patient absorbs about 1 c.cm. of the original solution per hour. Bronchiectatic patients appear to absorb more than do normal students. The application of these findings to the problems of inhalation therapy in general is discussed with special reference to the administration of penicillin. It is suggested that a guide substance which can easily be estimated chemically should be administered with the penicillin to simplify assay. Sulphacetamide seemed to be a suitable substance.

FLOREY, H. W., & JENNINGS, M. A. (1944). **The principles of penicillin treatment.**—*Brit. J. Surg.* **32.** Penicillin issue. 112–116. **1477**

The authors emphasize that success in the clinical use of penicillin is dependent upon an application of

the factors revealed by experimental investigations. They describe the properties of the drug and the methods of dispensing. Both the calcium and sodium salts are used, the latter having the advantage of being less hygroscopic. Penicillin is comparatively unstable and special precaution should be used to prevent its destruction. Solutions should, in general, be made only on the day of use. The organisms sensitive and insensitive to the drug are enumerated. Its fate in the body and methods of administration (local and general) are described. Systemically penicillin may be given intramuscularly or subcutaneously and a continuous drip may be given intravenously or intramuscularly. Powder, creams and solutions may be used locally; the drug is remarkably non-toxic, though reactions (*e.g.* pain, thrombophlebitis, generalized urticaria) are occasionally seen. These will very probably decrease with the use of purer material. The authors describe the types of clinical response to be expected and refer to the most important causes of failure in the treatment.—J. M. R.

KENYON, J., SEGAR, H. R., CRAN, J., & WALLERSTEINER, W. K. S. (1945). **Antipenicilliums in relation to penicillium therapy.**—*Med. Pr.* **213.** 70–78. **1478**

In penicillium therapy the whole filtrate from the culture is used, containing all the known metabolites of the growth of *Penicillium notatum*, living hyphae, and possibly other unknown metabolites as well. Such preparations with an activity equivalent to many thousand Oxford units of penicillin per ml. can apparently be easily and cheaply obtained, as the complex and costly extraction and purification processes involved in the production of penicillin may be simplified. It is claimed that the activity of such preparations is less easily inhibited than that of pure penicillin and that *in vitro* they show specific activity in cases where penicillin is inactive. Such preparations, of which hypholin is the latest development, have been used in the treatment of a number of cases, some of which are described. They have been injected intramuscularly and intravenously, and applied locally. Intrathecal administration is not advised until further investigation. The dosage suggested is the same as for penicillin.—J. M. ROBSON.

GARROD, L. P., & HEATLEY, N. G. (1944). **Bacteriological methods in connexion with penicillin treatment.**—*Brit. J. Surg.* **32.** Penicillin issue. 117–124. **1479**

This is a review of methods and though it contains nothing new, serves as a guide to those new in this field. It is important to determine the sensitivity of infecting organisms to penicillin, particularly in the case of *Staphylococcus aureus*, *Streptococcus viridans* and *Actinomyces hominis*, and qualitative and quantitative methods of doing this are described. Material from cases under treatment may contain penicillin (especially when the treatment is local), and this can be destroyed by penicillinase. If the material also contains a sulphonamide, the action of penicillinase can be prevented by adding p-aminobenzoic acid to the culture medium. Various methods of assaying penicillin solutions, and materials containing penicillin, *e.g.* dusting powders, ointments and creams, are discussed, as are the techniques used for assaying the penicillin content of blood, body fluids, pus and other exudates.—J. M. ROBSON.

COOKE, M., DAVENPORT, H. W., & GOODMAN, L. S. (1941). **The secretion of sulfonamide drugs in gastric juice.**—*Yale J. Biol. Med.* **14.** 13–28. [Authors' conclusions copied *verbatim*]. **1480**

1. The secretion of five sulfonamide drugs in the gastric juice was studied in dogs with large isolated stomach pouches. Sulfanilamide and sulfapyridine are more concentrated in the gastric juice than in plasma or whole blood. The mean concentration ratio of sulfanilamide is 2·6; of sulfapyridine, 3·2. Sulfathiazole, sulfadiazine, and acetylsulfanilamide are less concentrated in the gastric juice than in the blood, their concentration ratios being 0·16, 0·28, and 0·30, respectively. 2. The concentration ratios of all five sulfonamides appear to be independent of the secretogogue employed (histamine, carbaminoylcholine, or food), and independent of the free acid, total acid, neutral chloride, and organic constituents of the gastric juice. 3. The concentration ratios tend to vary directly with the blood concentration of sulfonamide (except in the case of sulfathiazole), and inversely with the rate of gastric secretion. 4. Acetylsulfanilamide is partly deacetylated in the dog and its presence appears to diminish the concentration ratio of free sulfanilamide. 5. Sulfathiazole, in particular, is secreted with difficulty by gland cells. 6. The significance of these findings with respect to the distribution of sulfonamides in the body is discussed.

TAYLOR, P. H., & HUGHES, K. E. A. (1944). **Infective dermatoses treated with penicillin.**—*Lancet.* **247.** 780–784. [Authors' summary copied *verbatim*]. **1481**

Penicillin is effective in the local treatment of certain skin diseases caused by cocci.

The most satisfactory method of treatment of sycosis barbae and impetigo is to spray the lesions with an aqueous solution containing 200 units of penicillin per c.cm.

An adequate dose of penicillin from the start is essential to prevent the development of penicillin-fast organisms. A strength of 200 units of penicillin per c.cm. or 400 units per g. of lanette base seems to be sufficient.

The pain in deep-seated lesions (furuncles) is much relieved after application of penicillin.

An underlying seborrhoeic state in cases of sycosis and impetigo is liable to cause relapse soon after cessation of treatment, and necessitates further courses of treatment.

The appearance of penicillin-insensitive organisms indicates that further treatment with penicillin is of little value.

BIGGER, J. W. (1944). **Treatment of staphylococcal infections with penicillin by intermittent sterilisation.**—*Lancet.* **247.** 497–500. [Author's summary copied *verbatim*]. **1482**

Penicillin is bactericidal for *Staph. pyogenes*.

Failure to sterilise broth containing *Staph. pyogenes* is due to the survival of a small number of staphylococci called persisters.

It is believed that persisters are insensitive to penicillin because they are temporarily in a non-dividing phase and because penicillin kills only bacteria which are about to divide.

Unlike resistant strains, descendants of persisters are easily killed by penicillin.

Penicillin fails to cure staphylococcal infections in the body because some of the cocci are in the persister phase.

A scheme of treatment in which penicillin is alternately administered and withheld is suggested, in the hope that bacteria in the persister phase will divide during an intermission and be killed by penicillin when its administration is recommenced.

ROACH, R. W. (1944). **The use of sulphathiazole per os, and of sulphanilamide E.O.S., sulphanilamide emulsion, acriflavine emulsion, proflavine sulphate solution, tyrothricin and novoxil, by udder infusion, in the treatment of clinical *Streptococcus agalactiae* mastitis.**—*Vet. Rec.* **56.** 457–458. **1483**

The drugs listed in the title were used in the treat-

ment of cows clinically affected with mastitis due to *Streptococcus agalactiae*. The selection of the cows used for each drug test was made at random, and the results were classified according to clinical reports and examination of the milk at stated intervals into (a) bacteriological cures, (b) clinical cures, and (c) clinical improvement. The conclusion from these experiments was that with the drugs tested nothing beyond a clinical response can be promised for clinical mastitis of the *Strep. agalactiae* type. R. emphasizes that the outlook towards the disease should be changed so that prevention is more widely advocated, and that more attention must be given to attempts at sterilization of the udders of infected cows not showing actual clinical symptoms of mastitis. —A. EDEN.

BUU-HOÏ, & RATSIMAMANGA, A. R. (1942). Chimiothérapie de la tuberculose expérimentale du cobaye par certains dérivés du chaulmoogra. [**Chemotherapy of TB. in g. pigs with chaulmoogra derivatives**].—*C. R. Soc. Biol. Paris.* **136.** 771–772. **1484**

Observations on the effect of an attenuated human strain of TB. in g. pigs injected with 0·5 ml. ethyl chaulmoograte twice weekly showed that the drug had no ameliorating effect upon the course of the disease. In a further series of experiments the toxic action of the double bond groupings in the drug was eliminated by the use of ethyl dihydrochaulmoograte which had the result of increasing the survival time of treated g. pigs. In these the lesions were found to be more discrete; there were none in the lungs and very few in the liver and spleen. The results are taken to indicate that ethyl dihydrochaulmoograte has an inhibitory effect upon the development of tubercle bacilli *in vivo*.—A. EDEN.

EVANS, D. G., FULLER, A. T., & WALKER, J. (1944). **New drugs active in the chemotherapy of experimental gas gangrene.**—*Lancet.* **247.** 523–527. **1485**

Two new drugs, *p*-methylsulphonylbenzamidine hydrochloride (V 187) and *p*-methylsulphonylbenzylamine hydrochloride (V 335) have been synthesized and found to have a potent local chemotherapeutic action in experimental gas gangrene infections in g. pigs. Their action, like that of marfanil (*p*-sulphonamidobenzylamine hydrochloride), is not inhibited by *p*-aminobenzoic acid. An extended study of V 187 has demonstrated its effectiveness against *Clostridium welchii*, *Cl. oedematiens* and *Cl. septicum* infections. It is well tolerated when given intramuscularly in therapeutic doses, though somewhat more toxic than V 335 or marfanil. *In vitro* and in the mouse V 187 is as effective against sulphanilamide-resistant streptococci as it is against a sulphanilamide-sensitive strain. In g. pigs, V 187 is rapidly absorbed and excreted after intramuscular and intraperitoneal administration. Given *per os*, it is poorly absorbed. The results *in vitro* suggest that V 335 may be of value against staphylococcal and *Pseudomonas pyocyanea* infections.—J. M. ROBSON.

GOODWIN, L. G. (1944). **The chemotherapy of experimental leishmaniasis. I. The spleen as an index of infection in the Syrian hamster.**—*Trans. R. Soc. trop. Med. Hyg.* **38.** 151–160. **1486**

As a result of investigations made to assess the use of the ratio of spleen-cell nuclei to parasites in spleen biopsy material as an index of chemotherapeutic efficiency, it is concluded that in infected hamster spleens containing 50 and over leishmania parasites per 100 spleen-cell nuclei, a fair estimate of the degree of infection can be obtained by counting 250 to 500 nuclei, but that lightly infected animals are unsuitable for accurate therapeutic tests. Infected control animals show a steady increase of infection which may be very rapid after spleen biopsy. Single subcutaneous doses of organic compounds of antimony such as neostibosan (dose 165 mg. per kg. body weight) and sodium stibogluconate (dose 500 mg. per kg.) have a measurable effect on the parasite count in the spleen, and drug action is uniform throughout the organ.—U. F. R.

HARDCASTLE, A. B., & FOSTER, A. O. (1944). **Notes on a protective action of borax and related compounds in cecal coccidiosis of poultry.**—*Proc. helminth. Soc. Wash.* **11.** 60–64. **1487**

Chicks resisted *Eimeria tenella* infection when given the organisms *per os* and fed on a mash containing 2% borax. The treatment must be begun not later than 72 hours after infection; it need be administered for only 24 hours, but this must cover the period 72–96 hours after infection. A 0·3% solution of borax replacing the drinking water proved as effective as the 2% ration and was less toxic.—C. HORTON SMITH.

SMITH, H. C., & HOWELL, D. E. (1944). **The chemotherapy of 275 cases of anaplasmosis.**—*Vet. Med.* **39.** 377–387. **1488**

An account is given of an outbreak of anaplasmosis involving 4,500 cattle on a ranch in Oklahoma, U.S.A. Severe losses had occurred in 1928–29, since when the disease had smouldered until a new outbreak occurred in 1942. Diagnosis was by P.M. examination, and blood from one cow was examined microscopically. Thus, in the majority of cases, diagnosis was based on clinical observations only. When treatment was commenced 18 animals had died in the previous few days, and 30 cows showed symptoms of anaplasmosis. The symptoms present, the conditions on the ranch, and the procedure adopted are briefly sketched, and reference is made to the literature on the chemotherapy of the disease.

Of 13 lines of treatment investigated, the most promising results, as judged by return to health of sick animals, were given by neosalvarsan (neoarsphenamine), tryparsamide, sodium cacodylate, cobalt chloride, "aricyl" (a disodium salt of acetarsonic acid), and sodium sulphathiazole. It is pointed out that tryparsamide solution can be prepared in advance, and that the toxicity is not increased by exposure and agitation, whilst it was considered necessary to prepare the neosalvarsan solution on the spot.

The cattle were treated under ranching conditions, and no extra feeding or nursing could be provided. In attempting to assess the severity of the disease in treated animals, an estimate was made of the blood haemoglobin, and it is noted that of 16 animals with readings of 25% (Tallqvist) only seven lived; whilst of 17 animals with readings of 35%, 14 lived. This may indicate that the critical point in haemoglobin loss in cattle is at a reading of about 30%.—U. F. R.

ATKESON, F. W., SMITH, R. C., BORGMANN, A. R., & FRYER, H. C. (1944). **Comparative toxicity under barn conditions of livestock type fly sprays made from various combinations of toxic ingredients and base oils.**—*J. econ. Ent.* **37.** 428–435. **1489**

Sixteen livestock sprays were compared for relative toxicity when used in a dairy barn. Each of the sprays was used at the rate of 1 ml. per 36 cu. ft.

The most efficient sprays in "knockdown" of flies were 3% thanite in oil, 2% lethane 384 in oil, and 3·75% of a 20 : 1 concentrate of pyrethrum plus 5% D.H.S. activator in oil. Pyrethrum alone was relatively poor in "knockdown".

3% thanite in oil was the best, while pyrethrum and lethane 384 were among the least efficient in killing power. When 5% D.H.S. activator was added to a spray containing 3·75% of a 20 : 1 pyrethrum concentrate, it ranked amongst the most efficient.

It is suggested that the percentage of kill is a better measure of toxicity of a livestock spray than the percentage of "knockdown".—W. MOORE.

BRITTON, J. W. (1944). **Phenothiazine as an anthelmintic in horses.**—*Vet. J.* **100.** 102–106. **1490**

B. reviews briefly the literature on phenothiazine as an anthelmintic for horses, with special reference to toxicity. The active anthelmintic substance appears to be phenothiazine itself and not its oxidation products, but the absorption of these products is responsible for the symptoms of poisoning. Digestive disturbances and other factors tending to diminish peristalsis increase oxidation and absorption, and the constipating action of phenothiazine itself may also increase absorption of the oxidation products. Toxic effects have often followed the administration of large doses of the drug, but after the thorough preparation of horses with bran mashes, large doses have been administered without ill effect. When small daily doses are given, little absorption takes place, and this is a useful method of administration of the drug to anaemic horses and brood mares. When single doses are employed they should not exceed 30 g. per 1,000 lb. body weight, and thorough preparation of the horses with several bran mashes prior to treatment should be carried out.—T. E. GIBSON.

GUILHON, J., & PRIOUZEAU, M. (1943). Essais de traitement de l'oesophagostomose nodulaire des Bovidés par la thiodiphénylamine. [**Treatment of bovine oesophagostomiasis with phenothiazine**].—*Rec. Méd. vét.* **119.** 161–164. **1491**

Five cases of oesophagostomiasis, diagnosed clinically, were treated with phenothiazine; all the animals had previously been treated at least once for distomatosis. The first animal, which weighed 180 kg., was given a dose of 100 g. of phenothiazine on each of three successive days, and although the appetite improved and thirst was reduced, constipation followed and the animal became unable to rise. It was slaughtered in order to confirm the diagnosis, and in the intestine were found large numbers of nodules containing *Oesophagostomum* larvae. The other four animals received 80, 70, 70, and 60 g. of phenothiazine respectively and, following treatment, the clinical symptoms of the disease disappeared. The authors conclude that phenothiazine in a suitable dose is effective for the treatment of larval oesophagostomiasis in bovines.
—T. E. GIBSON.

GORDON, H. McL. (1943). **The minimum dose of phenothiazine required to remove 100 *per cent.* of *Haemonchus contortus* from sheep.**—*Aust. vet. J.* **19.** 29–30. **1492**

Doses of 1, 2 and 3 g. of phenothiazine injected into the rumen of sheep weighing approximately 30 kg. resulted in temporary reductions in the number of eggs of *H. contortus* in the faeces. After ten days the egg counts returned to pre-treatment levels. Doses of 4 and 6 g. were 100% efficient, and a dose of 5 g. reduced the egg count permanently by 99·5%. It is concluded that doses exceeding 6 g. for sheep of 30 kg. body weight will almost invariably remove all female *H. contortus*. In older, heavier sheep, doses of 10 g., that is, half the dose necessary to obtain high degrees of efficiency against *Oesophagostomum columbianum* and *Trichostrongylus* spp., are likely to remove all the female *H. contortus* from most sheep.

LAWRENCE, E. A., & DURAN-REYNALS, F. (1941). **The effect of combining bacterial toxins and X-ray irradiation in the treatment of a transplantable mouse carcinoma.**—*Yale J. Biol. Med.* **14.** 177–181. [Authors' summary copied *verbatim*]. **1493**

1. Coli, paratyphoid B, and typhoid toxins do not prolong the life of mice bearing a transplantable mammary carcinoma. 2. The length of life of mice irradiated with X-ray and treated with these toxins is comparable to the length of life of mice treated with X-ray alone.

SERGENT, ET. (1944). Action d'un sérum préparé avec du venin de vipéridés du genre *Cerastes* sur l'envenimement dû aux vipéridés du genre *Vipera*. [**Action against the venom of snakes of the genus *Vipera* of an antiserum prepared from venom of snakes of the genus *Cerastes***].—*Arch. Inst. Pasteur Algér.* **22.** 16–17. **1494**

Antiserum prepared from the venom of snakes of the genus *Cerastes* gave a 90% protective action against lethal doses of *Cerastes* venom injected subcutaneously into white mice. The same serum protected 65 out of 100 mice injected with lethal doses of venom from snakes of the species *Vipera lebetina*. As a practical measure S. advises the use of antiserum "AN" in cases of bites from snakes of the *Vipera lebetina* type.—A. EDEN.

SERGENT, ET. (1944). Sérothérapie antiscorpionique (Septième note). Observations médicales reçues pendant l'année 1943. [**Serotherapy for scorpion sting in 1943**].—*Arch. Inst. Pasteur Algér.* **22.** 18–39. **1495**

S. gives some detailed statistics and observations on 380 persons bitten by scorpions in Algeria during 1943 and treated with anti-scorpion serum; of 104 serious cases, 82 were cured. Reviewing some 1,428 observations over the period 1936–43, he reports successful treatment in 83·5% of scorpion-bite cases with a grave prognosis. Particular observations made in 1943 include the suggestion that this was a particularly severe year for scorpion bites and that ordinarily, serious cases are rare during the winter and spring months.—A. EDEN.

ANDERSON, L. P., & MALLMANN, W. L. (1943). **The penetrative powers of disinfectants.**—*Tech. Bull. Mich. agric. Exp. Sta.* No. 183. pp. 23. **1496**

New methods, including the penetration into coccidial oocysts and strongylid larvae, have been used to study the action of various antiseptics. The results obtained agreed with those obtained when suspensions of *Staphylococcus aureus* were exposed to these antiseptics for a short time and the surviving bacteria determined quantitatively. The latter procedure is suggested as a method for measuring the penetrability of disinfectants. The authors conclude that penetration of bacteria by an antiseptic is essential to their ultimate destruction. Power to penetrate rapidly is a prime requisite of all compounds designed to kill bacteria in a short time. Iodine was found to penetrate rapidly, while merthiolate, azochloramid and brilliant green penetrated more slowly. Colloidal iodine penetrates more rapidly than crystalline iodine dissolved in alcohol or in potassium iodide solution.—J. M. ROBSON.

See also absts. **1473** (penicillin), **1528-1531** (sulphonamide treatment of mastitis), **1532** (of foot-rot), **1531** (of avian coryza and calf scours), **1388, 1389** (treatment of equine piroplasmosis), **1520** (insecticides, repellents, anthelmintics), **1426** (skim milk for worms in pigs), **1530** (anthelmintics, disinfection with soap in mastitis, with soda in erysipelas).

HYGIENE, PUBLIC HEALTH AND VETERINARY SERVICES

JOHNS, C. K. (1944). **Recent developments in milk control.**—*Canad. J. publ. Hlth.* **35.** 33–37. **1497**

The author stresses the importance of the odour test in detecting milk of doubtful quality. The strainer-dipper test is also used to detect flakes due to mastitis, slow cooling or mixing warm with cold milk. Where a

microscope is not available, the author suggests the methylene-blue or resazurin dye reduction tests and states that resazurin is much more sensitive than methylene-blue to the presence of leucocytes and other reducing substances in colostrum, late lactation milk and mastitis milk. He recommends the "triple reading" resazurin test.

In the control of pasteurized milk supplies, the direct microscopic clump count, supplementing the phosphatase and coliform tests, can be substituted for the plate count with very satisfactory results.

—THOS. MOORE (CANADA).

—. (1944). **The training and employment of milk sanitarians: a committee report.**—*J. Dairy Sci.* **27.** 691–699. **1498**

A committee of the American Dairy Science Association have attempted to define the functions of a "milk sanitarian", to make recommendations as to the training necessary for such officials, and to ascertain the scope and prospect of their employment.

The duties envisaged are comprehensive and include, in addition to the many other duties associated with the supervision of the milk supply, the inspection of dairy cows, investigations into outbreaks of milk-borne disease, chemical and bacteriological examinations, the recognition of infectious disease amongst employees, and the representation, in the law courts, of cases on behalf of health departments.

It is considered that the training undergone by the graduate in dairying is inadequate, but the institution of a special course is not justified. It is recommended that the student should be encouraged to take other courses along with his dairy work, the better to fit him for the post of milk sanitarian.

The Army Veterinary Corps, in addition to its work among army animals, is charged with the inspection of all foods of animal origin and there appears to be little or no opportunity for the dairy graduate to be commissioned to do sanitary work in the army. The committee consider that efforts should be made to alter this.

It is apparent that opportunities for the employment of dairy graduates as milk sanitarians do not exist in the United States public health services, whilst the positions available in city and state health departments are unattractive. The best situations at present appear to be with commercial undertakings.—H. E. B.

GUNDERSON, N. O., & LODIN, L. (1944). **Meat inspection in Illinois still a problem for municipalities.**—*J. Amer. vet. med. Ass.* **104.** 322–324. **1499**

For effective meat control programmes, from 4 to 8 cents per head [presumably of population] per year should be available, but at present most local authorities provide inadequately. The conditions under which meat is processed, the quality of meat sold, the shortcomings of municipal ordinances and the apparent lack of appreciation of the dangers to health involved, all act as limiting factors in the proper control of meat supplies.

Quality in meat is defined and a plea is made for *ante-* and immediate *post-mortem* inspection under qualified veterinarians for meat not covered by federal inspection in the U.S.A. A suitable state law to deal with the problem is considered the only solution.

—J. S. S. INGLIS.

*MONTEMAGNO, F. (1942). **[The viability of brucella in sausages].**—*Clin. vet., Milano.* **65.** 87. [Abst. from abst. in *Z. Fleisch- u. Milchhyg.* **53.** 217.] **1500**

A quantity of sausages was infected with cultures of *Brucella abortus*; these were still demonstrable 58 days after their introduction.—S. M. G.

GLÄSSER. (1943). Lehren aus einer kürzlich vorgekommenen Fleischvergiftung in der Stadt Hannover. [**"Meat poisoning" in Hanover**].—*Z. Fleisch- u. Milchhyg.* **54.** 1–3. **1501**

In Hanover, in July 1943, 90 persons were affected in an outbreak of "food poisoning" traced to meat from a pig which had previously been treated for suspected swine erysipelas. No cases of poisoning occurred when the meat had been properly cooked. *Salmonella enteriditis* was recovered from both the pork and the faeces of the patients.—S. M. G.

*SZUMOWSKI, W. (1942). Die Nahrungsmittelvergiftungen durch Enteneier. **[Salmonella infection from ingestion of duck eggs].**—*Gesundh. u. Leben.* **3.** 150–153. [Abst. from abst. in *Z. Fleisch- u. Milchhyg.* **53.** 59]. **1502**

A general instruction on the danger of "food poisoning" from eating raw duck eggs. About 50 million duck eggs are consumed in Germany each year.

BULL, L. B. (1943). **The future of the veterinary profession in Australia, with special reference to nationalization, and its relationship to veterinary education.**—*Aust. vet. J.* **19.** 55–58. Discussion p. 58. [Author's summary copied *verbatim*]. **1503**

The application of veterinary knowledge is essential to the well-being of the animal industry.

There are insufficient veterinary graduates in the country, either in government service or private practice, to make anything approaching adequate provision of requirements. Veterinary graduates scattered throughout the country are necessary to provide the backbone for the whole structure of veterinary service to the livestock industry.

Veterinary education should be raised to the highest level possible if graduates are to be properly equipped to give adequate service. Private enterprise has failed to build up a veterinary service at all adequate for the needs of the animal industry. The best way to build up the service is to create a national veterinary service attached to the advisory branch of the State department. Veterinary officers would then be placed in every centre where their services were required and where a private practitioner did not already exist. The State department would depend on the graduates in the national service for carrying out of advisory service but not for the regulatory services. Fees would be charged by the practitioners in the national service for services rendered apart from advisory service. A system of charges somewhat similar to that in practice in Tasmania might be adopted. Private practitioners would retain freedom of action and there would be no competition between them and officers in the national services. They might be asked, however, to join in some of the national service activities and special advisory campaigns.

A strong national veterinary school should be established, and training in clinical medicine should be strengthened. Provision should be made for post-graduate education in all the States, and attendance of graduates in the national service at the schools from time to time should be obligatory.

MITCHELL, C. A. (1944). **Veterinary medicine in Canada in the post war period.**—*Canad. J. comp. Med.* **8.** 281–288. **1504**

The author discusses factors which have hindered the recognition of the value of veterinary service to the community. The failure of provincial governments in Canada to enact suitable legislation until recent years, the failure of universities to form veterinary faculties, and a too intimate association with agriculture have also militated against the profession. In the past, emoluments have been insufficient and the number of

graduates too low. The author advocates the formation of a strong Veterinary Medical Council in Canada; there is at present an embryo council. Its first task should be to study the needs of Canada for veterinary service and to suggest ways and means of maintaining a body of veterinarians to meet these needs. Assuming that satisfactory economic returns can be provided, educational facilities must be increased. Each new school should be a faculty of a university. The author speaks of post-war development and the effect of the entry into the profession of men who have served in the armed forces during the war.—R. G. (CANADA).

NYASALAND PROTECTORATE. (1944). **Post-War Development Committee. Interim report No. 4.—Crops, animal products and the amalgamation of agricultural and veterinary departments.** pp. 4. Zomba: Govt. Printer. [4to]. **1505**

The post-war development committee considers that the proper economy of Nyasaland requires the intelligent keeping of cattle by natives, but an essential preliminary is a tsetse-fly control scheme. The main concern in native production is to improve standards of nutrition, and cattle also play a direct part in soil conservation and the preservation of soil fertility.

A scheme is recommended for the selective breeding of native stock under the supervision of the chiefs with the guidance of both the agricultural and veterinary departments. Other recommendations are the development of the ghee industry, the laying down of pastures, a pasturage survey and an attempt to induce owners to practise stall-feeding.

The agricultural and veterinary departments should not be amalgamated, but the veterinary department should concentrate on the diagnosis, treatment and prevention of animal diseases.—U. F. RICHARDSON.

See also absts. **1394**, **1395** (rabies control), **1404** (psittacosis), **1423**, **1424** (hydatid).

TECHNIQUE AND APPARATUS

*SPORS, H. (1942). Die Abtötung von Sporen im Fett durch Hitze. [**Killing by heat of spores in fat**].—*Inaug. Diss., Berlin.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **51.** 139. (1943).]. **1506**

The author discusses the following factors in the killing of spores in fat by heat: the temperature and amount of heat used and whether it is wet or dry heat, the water content of the material, the kind of container employed, and the type of spore and its power of heat resistance.—S. M. G.

VAN GOIDSENHOVEN, C., & SCHOENAERS, F. (1942). L'isolement des trypanosomes par centrifugation fractionnée du sang. [**Isolation of trypanosomes from blood by fractional centrifugation**].—*Ann. Soc. Belge méd. trop.* **22.** 213–222. **1507**

The various methods adopted for the separation of trypanosomes from blood are reviewed, and investigations are recorded into the specific gravity of the red blood cells of various animals (horse, ox, rat, rabbit, g. pig) and into the factors which influence the rate of red cell sedimentation. To effect separation of trypanosomes from the blood cells, a suspending fluid containing sodium citrate and sodium sulphate, with a specific gravity of 1·049, proved satisfactory, but distorted the trypanosomes. The method finally adopted was as follows. The blood was centrifuged at 7,000 r.p.m. for 5 min. [type of centrifuge not mentioned], and the deposit suspended in normal saline. Centrifugation was carried out at 1,000–1,200 r.p.m. for 10 min. and the supernatant fluid and the greater part of the leucocyte layer were collected. The red cell deposit was resuspended in saline and the centrifugation and collection of the supernatant fluid were repeated three times. The collected material was then centrifuged at 7,000 r.p.m. for 5 min., resuspended in normal saline, and again centrifuged as before. The deposit was collected, and about double the quantity of a mixture of equal parts of normal saline and pure glycerin was added as a preservative if the trypanosomes were required as an antigen, as in the dourine complement-fixation test.—U. F. RICHARDSON.

I. SMYTH, J. D. (1944). **A technique for mounting free-living protozoa.**—*Science.* **100.** 62. **1508**

II. CHEN, T. T. (1944). **Staining nuclei and chromosomes in protozoa.**—*Stain Tech.* **19.** 83–90. **1509**

I. After the organisms have been fixed in Schaudinn's solution and brought through 70% and 90% into absolute alcohol by gentle centrifugation, they may be affixed to glass slides to avoid the necessity of further centrifugation. A very thin smear of albumen is made on a clean slide and absolute alcohol containing the organisms is then dropped on the slide. The dropping force and the quick coagulation of the albumen by the alcohol secures the organisms to the slide, which is then placed in absolute alcohol and treated as an ordinary section. This treatment minimizes the damage caused to the organisms by successive spins in the centrifuge, and the thin film of albumen does not interfere with the staining reactions of the protozoa. [The albumen-film method has been used with success in testing disinfectants on slide-affixed coccidial oocysts and in the staining of parasitic ciliates from the intestines of frogs.]

II. Successful staining of the nuclei of free-living forms such as *Paramoecium* and parasitic forms such as opalinids is described. Fixation in both cases takes 5–15 min. in hot Schaudinn's fluid containing 5% glacial acetic acid. *Paramoecium* is dehydrated to 83% alcohol and then mounted on albumenized cover glasses. A thin layer of collodion is applied to the cover glasses to prevent loss of the protozoa. The specimens are then taken down to water, mordanted in 4% ferric alum for 24 hours, stained for 24 hours in 0·5% haematoxylin, differentiated by saturated aqueous solution of picric acid, rinsed in tap water, exposed to ammonia vapour for a second, rinsed again, washed in running water for an hour, dehydrated, cleared, and mounted in damar. Wet smears carrying parasitic opalinids are, after fixation, passed down the alcohols to water, mordanted for 24 hours in ferric alum and stained in haematoxylin for 24 hours. They are differentiated as for *Paramoecium*. The Feulgen reaction is obtained by fixing in modified weak Flemming's fluid for one hour and washing in running water for 30 min. After hydrolysing, the smears are left in fuchsin decolorized with H_2SO_3 for three hours, washed in H_2SO_3, left in running water for 15 min., passed through the alcohols to 95%, counterstained with fast green FCF for two min., dehydrated in absolute alcohol, cleared, and mounted in damar.

—C. HORTON SMITH.

WITLIN, B. (1944). **Self-buffering staining solutions. With special reference to Wright's polychrome methylene blue-eosin stain.**—*J. Lab. clin. Med.* **29.** 1097–1099. **1510**

A simple method of buffering Wright's stain in order to obtain uniform results has been evolved by incorporating a sodium acetate-acetic acid mixture in the methyl alcohol solvent. The preparation and use of the stain are described in detail and the results com-

pared with those obtained with the unbuffered stain.
—H. SCOTT MCTAGGART.

ELVERS, C. F. (1944). **Polychrome no. 28 : a simplified polychrome stain for use in the clinical laboratory.** —*J. Lab. clin. Med.* **29.** 1094–1096. **1511**

This stain, which consists of tetramethyl thionine and rosaniline hydrochloride in a buffered solvent, was primarily evolved for staining urinary deposits and seminal secretions. It is rapid in action and produces minimal shrinkage of cells. The technique is completed in a single process. The preparation and use of the stain are described in detail and the differential staining reaction is illustrated by a colour plate.
—H. SCOTT MCTAGGART.

GAIRNS, F. W. (1944). **Preparing specimens of bone and teeth for cutting by the paraffin method.**—*Stain Tech.* **19.** 127–129. [Author's abst. copied *verbatim*]. **1512**

A method of preparing bone or teeth for sectioning is described which involves the following steps : 48 hr. in 1 : 10 formalin ; 24 hr. in 70% alcohol ; decalcification for several days in 10% HNO_3 ; rinsing and transferring to 2% potassium alum for 12 hr. ; rinsing and treating with 5% $NaHCO_3$ (or Li_2CO_3) for 24 hr. ; washing for 12–24 hr. ; then passing through ascending grades of alcohol to xylene. In the case of developing teeth, a slightly different procedure is recommended : fixation in Heidenhain's SUSA till hard tissue is decalcified ; 24 hr. in 96% alcohol (with three changes) ; 24 hr. in absolute alcohol (with one change) ; clearing in xylene or chloroform, and embedding in paraffin.

CLAUDE, A., & FULLAM, E. F. (1945). **An electron microscope study of isolated mitochondria. Method and preliminary results.**—*J. exp. Med.* **81.** 51–62. [Authors' summary copied *verbatim*]. **1513**

The present paper constitutes a preliminary study of the morphology of mitochondria by means of electron microscopy.

The mitochondria that were the subject of this investigation were obtained from a lymphosarcoma of the rat. They were separated from the other components of the leukemic cells by a method of differential centrifugation, and thus made available for direct examination in the electron microscope.

In the purified form the mitochondria appeared as spherical bodies, the majority of them varying in size approximately from 0·6 to 1·3μ in diameter.

Certain aspects of mitochondria in the electron microscope suggest that these elements are surrounded by a differentiated membrane. In some cases the limiting membrane seemed to be responsible for maintaining the general shape of the mitochondria, even when most of the mitochondrial substance had been lost.

By means of the electron microscope, it is possible to distinguish small elements, 80 to 100 mμ in diameter, within the body of certain mitochondria. Further work is suggested to establish whether these small granules are normal constituents of mitochondria, and what relation may exist between them and ordinary microsomes.

The nature of mitochondria as morphological units is discussed. Present evidence indicates that mitochondria constitute definite physical entities which can persist in the absence of the cytoplasm.

MUSSILL, J. (1943). Eine Methode der Befundaufnahme bei Sterilitätsbehandlungen. [**Recording of examinations for sterility**].—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* **51/49.** 103–104. **1514**

A description is given of the author's method of recording briefly the findings on rectal examination for sterility, as well as the treatment advised. This method involves marking with blue chalk on the croup while the examination is in progress, and using a code system for the different salient features. Important details can thus be correctly recorded and omissions avoided.
—A. ROBERTSON.

PUGSLEY, H. E., & FARQUHARSON, R. F. (1944). **Factors influencing the rate of flow of intravenous infusions. (With special reference to venoconstriction induced by serum).**—*Canad. med. Ass. J.* **51.** 5–11. **1515**

Infusions given into large veins always flowed rapidly. In small veins, cooling the fluid caused contraction of the vein and decreased the rate of flow, whereas heating the fluid dilated the vein and increased the rate.

The nature of the fluid had a striking effect on the rate of flow. Human serum and reconstituted dried plasma contained a factor which produced a sustained contraction of the vein with a resultant slowing down, but this was not demonstrated in fresh citrated whole blood, fresh citrated plasma, saline, or 5% glucose solution. The nature of the venoconstrictor was not determined. It was not related to the blood group of the donor or to the pH of the fluid. Increased pressure produced a marked increase in rate of flow unless there was strong contraction of the vein, in which case a rapid flow was not induced and pain was produced.
—R. GWATKIN (CANADA).

See also absts. **1528**, **1529** (agar substitute, semen diluents), **1459** (artificial insemination), **1530**, **1531** (electrometric mastitis diagnosis), **1393** (virus size determination), **1402** (chick-embryo cultivation of laryngotracheitis virus), **1455** (haemoglobin determination), **1535** (veterinary surgery).

MISCELLANEOUS

—. (1942). **Australia. The Institute of Inspectors of Stock of New South Wales. Year book 1942.** pp. 68. Sydney : The Institute. [8vo] **1516**

The year book records papers presented at the annual meeting of the Institute. The papers are : A note on hypocalcaemia in ewes by T. R. JONES, Mixed farming leads to stability by M. C. FRANKLIN, Control of hydatids by H. E. R. BEATTIE, Some spectacular horse mortalities by K. V. BYRNE, The present economy in concentrates by H. J. GEDDES, Trichostrongylosis—black scours by H. McL. GORDON, The duties of an inspector of stock under the Pastures Protection Act by T. HILDRED, Malnutrition by M. HENRY, An atypical enterotoxaemia by J. G. JOHNSTON, Some aspects of assisting increase of food production by D. F. STEWART, Ophthalmia—pink eye rickettsiae in stock by H. YEOMAN, Food production and animal health by W. L. HINDMARSH, Brucellosis of swine by R. O. C. KING, Field investigations into careless use of irritant poisons by T. K. RYAN, and An unusual tick (*Amblyomma triguttatum*) found on sheep by H. YEOMAN.
—H. McL. GORDON (AUSTRALIA).

—. (1943). **Memorandum on farm buildings. Prepared by the National Veterinary Medical Association of Great Britain and Ireland.**—*Publ. Nat. vet. med. Ass. Gt Brit.* No. 7. pp. 48. **1517**

This memorandum consists of the recommendations submitted by the National Veterinary Medical Association to the Ministry of Agriculture Advisory

Committee on Farm Buildings for England and Wales. In the general introduction, it deals with some of the general principles affecting the design of farm buildings, their siting, general layout, and structure. In successive sections there are put forward somewhat detailed recommendations for the construction of houses for horses, dairy cows, bulls, feeding cattle and pigs. The various sections include such considerations as the general plan of the buildings, floors, drainage, disposal of manure, ventilation, lighting, water supply, standings and stalls, loose boxes, and arrangements for feeding. Other sections deal with the construction of the dairy and cooling house and with milk sheds and parlours. The memo states that the Association was much impressed with a method of housing large numbers of pigs which has been found to be very satisfactory in Northern Ireland; a detailed description of this type of piggery is given [see also *V. B.* **12.** 560]. Included in two appendices are tabulated recommendations in respect of each species for "cubic space per head", "air requirements per head per hour", lighting requirements, and dimensions for ventilators, width of passage ways and doors, and height of walls.—N. J. S.

BRANDER, G. C. (1944). **Animal husbandry in the southern Sudan.**—*Vet. J.* **100.** 141–149. **1518**

A general account of the life and customs of the cattle-owning tribes of the southern Sudan. The difficulties met with in attempting to apply European ideas of animal husbandry and disease control are well covered.—J. A. GRIFFITHS.

REPORTS

CANADA. (1944). **Report of the Veterinary Director General for the year ended March 31, 1944.** [BARKER, M.] pp. 35. Ottawa: Printer to the King's Most Excellent Majesty. [8vo]. **1519**

CONTAGIOUS DISEASES SECTION [BARKER, M.]—There were no outbreaks of ANTHRAX, DOURINE, GLANDERS, or SHEEP SCAB.

289,416 cattle were tested for TUBERCULOSIS and 0·14% reacted under the accredited herd plan. In Area Testing, 1,024,738 cattle were tested and 0·9% reacted. Of 26,495 cattle tested under the Supervised Herd Plan 0·56% reacted. Among 1,836 cattle tested at ports, 0·98% reacted. Details are given of all tests carried out since 1925. 2,736 herds are supervised for BRUCELLOSIS control, and of these 1,781 are listed as free from the disease. Eighteen dogs and one cat were found to be infected with RABIES. There were five outbreaks of SWINE FEVER and 426 pigs were slaughtered. Only seven cases of MANGE occurred in horses; 16 cattle were found infected in four outbreaks.

MEAT AND CANNED FOODS SECTION [MACONACHIE, C.]—There has been a great increase in the activities of this section without a corresponding increase in the staff available. There were 95 establishments operating under the Meat and Canned Foods Act. Animals slaughtered were 1,711,176 cattle including calves, 600 bison, 949,838 sheep, 131 goats, 8,395,593 pigs, and 863,419 poultry.

The percentages of condemnations of carcasses were 1·07% of cattle, 0·39% of sheep, 0·23% of pigs, and 1·53% of poultry. The main causes of condemnation were TUBERCULOSIS (35·31% in cattle and 32·15% in pigs), IMMATURITY IN CALVES (58·81%), EMACIATION and MUCOID DEGENERATION (cattle 17·09%, calves 20·51%, sheep 47·20%, pigs 22·34%), and PNEUMONIA (cattle 6·26%, sheep 18·55%, and pigs 4·51%).

—J. A. GRIFFITHS.

AUSTRALIA. (1941). **Fifteenth annual report of the Council for Scientific and Industrial Research, for year 1940-41.** pp. 107. Items of veterinary interest pp. 22–24 and 27–33. Canberra: Govt. Printer. [fcp] [4s. 9d.] **1520**

The value of the complement-fixation test in BOVINE TUBERCULOSIS had been confirmed and the problem of deterioration of the antigen had been overcome.

Corynebacterium ovis treated with sodium lauryl sulphate proved highly antigenic for preparing agglutinating antisera against CASEOUS LYMPHADENITIS, but was of no special value as a vaccine against infection.

Investigations on the trypsin-activating effect with the toxin of *Clostridium welchii* Type D suggested that, hitherto, strains for the production of vaccine for ENTEROTOXAEMIA of sheep had been selected upon a faulty principle, and that considerable improvements in immunizing capacity should follow the application of this new principle.

Further studies with standard culture vaccine for BOVINE CONTAGIOUS PLEURO-PNEUMONIA appeared to show that there is no constant association between the virulence and the immunizing capacity of the causal organism.

Attempts failed to isolate the rickettsia which is constantly present in the conjunctiva in INFECTIOUS OPHTHALMIA (PINK EYE) of sheep, but the presumptive evidence of its causative role is very strong. The rickettsia occurred in two phases which are briefly described. Infection had been produced with lachrymal secretion from sheep that had shown no symptoms for more than 100 days. Contact in pens with such carriers resulted in infection. Recovered sheep were usually immune for 200–300 days.

Studies on the relative importance of live sheep and carrion as breeding places for the SHEEP BLOWFLY, *Lucilia cuprina*, showed that carrion is a very unfavourable medium, owing to competition, parasites, predators, and high carcass temperatures (100°–115°F.). The living fly-struck sheep is the chief breeding place. Breeding of flies in baits in fly-traps was prevented if borax was sprinkled over the surface. Ammonia production [see *V. B.* **13.** 93.] and cuticular permeability of the maggots were studied. A technique for the latter study is briefly described. Arsenious oxide, 0·4%, with or without wetting agents was non-toxic to prepupae as a contact larvicide. Further studies of stomach larvicides [see *V. B.* **12.** 32.] showed αα-dipyridyl to be about as toxic as nicotine. Dinitro-*o*-cyclohexylphenol and proflavine were slightly toxic. Sulphanilamide, sodium diethyldithio-carbamate, quinhydrone and iodo-acetic acid were non-toxic at 0·2% in the enriched medium used. The dressing mentioned in the previous report had been modified and was known as B.T.B. 15. It consisted of 15% boric acid, 3% bentonite, 2% tar oil, 0·5% wetting agent, and 79·5% water. [For details of preparation etc., see *V. B.* **12.** 613.] Essential oils were further studied as repellents. Ceylon citronella oil showed the greatest promise and was better than Java citronella oil or camphor oil. Australian eucalyptus oils were not repellent, but oils from *Zieria* and the Huon pine (*Dacrydium franklinii*) showed repellent properties. Trials of the Mules operation on lambs at marking time were completed. More skill and experience are required when the operation is performed on lambs than on older sheep, and retreatment is more frequently necessary. A further trial showed that even in plain-breeched sheep the Mules operation was of value in preventing fly strike.

Further investigations showed that the dung fly *Scatophaga stercoraria*, is unlikely to be of value in the control of the buffalo fly, *Lyperosia exigua*, in Australia.

Studies on the bionomics of the cattle tick (*Boophilus annulatus australis*) showed that the number of eggs deposited and percentage emergence of larvae increase as humidity increases. No emergence occurred from eggs held at 70% relative humidity and 21·5°C. The lowest temperature for development appeared to be about 15°–16°C. Engorged females were difficult to "wet" with arsenical dips. The relationship between wetting and efficiency of dips was being studied.

A new mite parasite (*Psorergates ovis*) was found in the skin of sheep. Its presence caused chronic irritation and the fleeces of affected sheep showed a thin, "pencilly" tip; elasticity and tensile strength were impaired and the fibre was "perished" and "rotten". *Demodex* sp. was found in the skin of sheep but did not appear to produce any obvious abnormality.

Large doses of trichostrongyle larvae, up to 50,000 each in young sheep, caused rapid loss of condition. The course of the TRICHOSTRONGYLOSIS so produced was very rapid, and death occurred in some cases 18–20 days after administration of the larvae. Most of the worms recovered from such cases had not reached maturity. Observations at the field laboratory at Armidale showed that *Haemonchus contortus* infestation is acquired in spring, summer, and autumn, and within this period is related to rainfall. *Oesophagostomum columbianum* infestation is acquired in late spring, summer, and early autumn, but its effects are not usually seen until the winter months. *Trichostrongylus* spp. infestation is acquired in late autumn, winter, and early spring, and its effects may not appear until some months later. *Dictyocaulus filaria* infestation is picked up in late autumn, winter, and early spring, and may be spontaneously thrown off when vigorous pasture growth occurs in spring.

Field trials showed that a single dose of 14 g. phenothiazine gave satisfactory results against *O. columbianum* in over 80% of young sheep 10 months old and weighing about 50 lb. In adult sheep weighing 80 lb., doses of 15–20 g. were similarly effective. Larger doses, 22–28 g., were needed to obtain a satisfactory effect against *Trichostrongylus* spp. Doses of 0·6 g. per kg. body weight were very effective against *Nematodirus* spp., but were ineffective against *Strongyloides papillosus*. A single treatment with phenothiazine was comparable in effect against haemonchosis to two treatments with the usual anthelmintic drugs. A certain proportion of a flock infested with *H. contortus* fail always to respond to treatment with copper sulphate + nicotine sulphate mixture. [The failures are probably sheep in which the oesophageal groove reflex does not respond to copper salts.] Sheep which do not respond to this mixture may be successfully treated with carbon tetrachloride. Neither osmotic effects nor the reaction of the solution were found to be responsible for the physiological effects of cupric salts on the oesophageal groove reflex.

Further studies were carried out under quarantine conditions on MYXOMATOSIS in a rabbit population infested by an indigenous stickfast flea, *Echidnophaga myrmecobii*. A high proportion of rabbits died but within 70 days the epizootic had spent itself. Surviving rabbits were caught and were shown to be susceptible to the virus. It was concluded that the disease died out when the population became so sparse that spread was difficult or impossible.

The early lesion in BALANITIS (PIZZLE ROT) of sheep is an ulceration round the external orifice of the preputial sheath. Progress may be slow or the lesions may heal spontaneously at almost any stage, but when the preputial orifice is narrowed relapses usually occur. All attempts at transmission have failed. Observations strongly suggest that balanitis is related to diets that are rich in protein.

The hypothesis that top-dressing with gypsum delays the onset of BOVINE HAEMATURIA was supported by field observations. Pasture analyses indicated a higher molybdenum content in affected areas than in areas where the condition does not occur. There was a reduction of molybdenum in pastures from affected areas which had been top-dressed with gypsum.

Merino ewes offered salt licks containing copper and cobalt, consumed in two years sufficient to provide approximately 100 mg. Cu per day, an amount far in excess of their requirements, and remained in perfect health and reared normal lambs. The Cu content of the livers ranged from 38–940 p.p.m. on a dry basis. Nineteen ewes subjected to conditions of uncomplicated COPPER DEFICIENCY for two years dropped a total of 16 lambs, of which five were born dead, nine developed ATAXIA within four months, and two died of weakness without showing symptoms of ataxia. Gross lesions, typical of acute Cu deficiency, were observed in brain sections of some of the still-born lambs. Wool grown by sheep on Cu-deficient soil loses its normal crimp and becomes lustrous and straight or sometimes slightly wavy. Examinations of wool from practically all wool-producing properties in South Australia showed that "straight steely" fleeces occurred over a wide region of the south-east and in Eyre's Peninsula. Agrostological investigations on sown pastures and cereals on Cu-deficient soils showed marked responses to top-dressing with Cu, and still further responses to applications of zinc. When Cu was administered into the abomasum of sheep there was a material increase in Cu concentration in the blood within 30 min. It is suggested that Cu was absorbed from the abomasum or the duodenum.

The sheep's cobalt requirements were shown to be little more than 0·1 mg. per day. Deficiency of calcium, in an otherwise adequate diet, resulted in great depression of appetite. Body growth and development of the teeth were greatly retarded. The addition of 1% calcium carbonate permitted normal growth and development.

PEG-LEG of cattle was shown not to be an uncomplicated phosphorus deficiency. Further work was proposed in order to study the significance of trace elements in the disease.

The comparative capacity had been determined of a number of fodders to provide energy necessary for maintenance during drought. The results had been published in the form of a nomogram.

The obvious differences in conformation between sheep on a high plane of nutrition and those on a low plane, even in twin animals, illustrate some of the difficulties encountered in selective breeding under conditions of variation in nutritive value of pastures. The strong-woolled sheep produced approximately twice as much wool, even at low nutritional levels, as the genetically fine-woolled sheep. Studies on the histology of foetal skin and the development of the fleece in the merino were continued. The plane of nutrition was found to affect the density of fibre population. Greater skin growth and development of skin wrinkles occurred in sheep on higher planes of nutrition. Among strong-woolled sheep a high plane of nutrition increased slightly the variability in fibre diameter, but in fine-woolled sheep the opposite effect was observed. The ratio of primary to secondary follicles was found to be 1 : 21 in the fine-woolled and 1 : 15 in the strong-woolled sheep.

Results so far suggested that the occurrence of black-woolled sheep closely approximated that expected for a mono-hybrid population, black being recessive.

The periodicity of oestrus in sheep was more restricted in some strains than in others of the same breed, and was not identical for all localities; the greatest number, however, were capable of being bred during the autumn and winter months. The occurrence of abundant green feed after dry conditions did not produce a rapid occurrence of oestrus and did not increase the proportion of ewes coming into oestrus.

The following investigations are briefly mentioned:—MASTITIS of cows; bush fly (*Musca vetustissima*); pathogenicity of *Nematodirus* spp., recovery of nematode larvae from pastures; TOXAEMIC JAUNDICE of sheep; phosphorus and energy metabolism of sheep; chemical and physical studies on wool; inheritance of skin wrinkles and horns in sheep; FLUOROSIS in sheep, and zebu hybridization.—H. McL. GORDON (AUSTRALIA).

AUSTRALIA. (1941). **Fifth annual report of the Australian Wool Board, for year 1940-41.** pp. 29. Items of veterinary interest pp. 12–14, 16–24 and 28. Canberra: Govt. Printer. [fcp]. **1521**

The work of the International Wool Secretariat on wool promotion, publicity, education, economic research and technical research is briefly described.

Investigations on pastoral research in Australia are described in greater detail. These investigations form part of those described in the 15th Annual Report of the Council for Scientific and Industrial Research [see preceding abst.].

The report includes references to investigations of pasture problems in several regions of Australia.

—H. McL. GORDON (AUSTRALIA).

EIRE. (1943). **Twelfth annual report of the Minister for Agriculture 1942-43.** pp. 159 + [77]. Items of veterinary interest pp. 37–47, 73–75, 115–119, [6]–[7], [30] & [52]–[56]. Dublin: Stat. Off. [8vo] [3s. 6d.] **1522**

[REPORT OF THE] VETERINARY COLLEGE OF IRELAND. There were 286 students in attendance and 28 gained the M.R.C.V.S. diploma. 5,248 cases were treated in the college clinic including 1,274 horses, 386 cattle, 3,379 dogs and cats, and 177 pigs. Brief details are given of the various departments and their activities.

The General Pathology and Bacteriology Department examined 2,936 specimens. 24% of 1,219 milk samples were from mastitis cases. The 297 mastitis cases were 60% streptococcal, 30% staphylococcal, 9% mixed streptococcal and staphylococcal, 0·7% corynebacterial, 0·2% tuberculosis, and 0·1% *Bacterium coli*. In 1,282 agglutination tests, 15% were positive for *Brucella abortus* infection. Details are also given of conditions found among the other specimens examined. A field experiment on the control and eradication of mastitis (mixed streptococcal and staphylococcal) by active immunization was carried out by the Department on a large dairy herd under veterinary supervision. The experiment is not complete but so far there has been a reduction of the 40% infection rate to 4%.

Details are given of the results of examination of 105,399 specimens by the Poultry Pathology Section. Of these 102,509 were PULLORUM DISEASE tests.

In the Parasitology Section 550 specimens were examined, of which 94% were helminths. *Babesia bovis* was found in six blood smears.

[REPORT OF THE] VETERINARY RESEARCH LABORATORY. The 2,155 specimens examined included one of ANTHRAX, 1,058 of TUBERCULOSIS, 653 of BOVINE CONTAGIOUS ABORTION, one of PARASITIC MANGE, and 53 of SHEEP SCAB.

Vaccines prepared and issued were 4,201 doses for BOVINE CONTAGIOUS ABORTION, 38,661 for BRAXY, and 60,332 for BLACKLEG.

Research work was confined to the study of the immunity produced by the BOVINE CONTAGIOUS ABORTION vaccines prepared at the laboratory [no details are given].

The veterinary surgeons employed under the Veterinary Dispensary Scheme received subsidies from the Department of Agriculture. Of the 40 dispensaries provided for under the scheme, 18 were in operation. 1,503 cases were treated at the dispensaries and 361 cases were treated on the farms.

SCHEDULED DISEASES OF ANIMALS. 1,914 cases of BOVINE TUBERCULOSIS were reported and 921 animals were slaughtered. The disease was confirmed in 864 cases. Of these, 624 cases were in Munster. There were 193 outbreaks of SHEEP SCAB involving 1,788 sheep. No other outbreaks of scheduled diseases occurred.

The scheme for compulsory treatment of animals visibly infested with WARBLE FLY was continued as far as the limited supplies of derris powder allowed.

—J. A. GRIFFITHS.

INDIA. (1943). **Annual report of the Imperial Council of Agricultural Research, 1941-42.** pp. 130. Delhi: Manager of Publications. [Rs. 4. As. 10 or 7s. 3d.] **1523**

This, the 12th report of the Council, is divided into seven main chapters, dealing with, amongst other things, administration, agricultural research, animal husbandry research, combined agricultural and animal husbandry research, and agricultural marketing; there are seven appendixes.

Since the activities of the Council have increased considerably, its policy has been modified in that it now suggests new schemes of co-ordinated research in the light of all-India requirements, indicating where the different items of research should be carried out, and seeking the co-operation of the various provincial and state governments concerned, instead of leaving the whole initiative in their hands. The Council has set up a separate scientific committee for each science or group of sciences and each of these committees by itself or in co-operation with others provides the machinery by which the research programmes are to be initiated, reviewed, and co-ordinated.

Veterinary disease investigation officers have been appointed in all provinces and some states. Altogether, 13 such officers were working during the year. The cost of the scheme is now shared equally by the provinces and the Council except for three provinces which contribute only 25%. The report gives a brief summary of the work of the investigation officers and also deals with investigations into TUBERCULOSIS, JOHNE'S DISEASE, CONTAGIOUS ABORTION, WARBLE FLIES and TICKS, and POULTRY DISEASES, which are being carried out at the Imperial Veterinary Research Institute.

Increasing importance is now attached to maintaining animals in health by giving suitable advice on breeding, nutrition and management. Under breeding schemes for cattle, sheep and goats, various research items are in progress. Investigation into transmission of genetic factors among cattle and artificial insemination in livestock were not started as staff had not been appointed. Herd books and pedigree registration for certain cattle breeds were started. Definitions of breed characteristics of certain breeds of cattle were also published. The goat- and sheep-breeding schemes are mainly for developing India's indigenous breeds. Under goat-breeding schemes experiments were conducted on the economic age of mating and weaning, oestrus, live-weights and measurements of kids the

percentage of butter-fat in the milk, and the effects of castration at different ages. Animal nutrition schemes are in progress in all provinces. Pasture survey, mineral deficiencies, and the feeding value of different food grains, oil seeds, oil cakes, molasses, etc., are other problems under investigation.

A number of village projects are working on combined agriculture and animal husbandry. Mixed farming as an experimental measure has been started in four provinces to ascertain the economics of this type of farming, whereby the land supports the animals and the latter in turn support the land.

A report on milk was issued.

The growth of and service rendered by the Council's large library for the last five years are shown in a table. The library has a reading room with seating accommodation for 30 persons. There are about 22,000 books, 18,000 pamphlets and 450 periodicals. During the year 2,357 books and publications were added.

Appendices III & IV give receipts and expenditure and the expenditure incurred on various research schemes in progress.—M. K. SREENIVASAN (INDIA).

CYPRUS. (1943). **Annual report of the Director of Agriculture for the year 1942.** pp. 4. Items of veterinary interest pp. 2–3. Nicosia: Govt. Printing Office. [fcp]. **1524**

Wartime conditions have restricted the activities of the Veterinary Department, but the manufacture of the single spore ANTHRAX vaccine was continued, and 500,000 animals were vaccinated. Five outbreaks of anthrax occurred, but no cases occurred in vaccinated animals. Over the four years 1939–42 the warble fly campaign has resulted in the decline of the maximal monthly infection rate from 78·4% to 0·21%. Research on relapsing fever has revealed the presence on the island of *Ornithodorus tholozani*. Experiments were carried out on the production of sera containing precipitins against the milk of various animals, and proved capable of detecting a 5% adulteration of cow's milk with sheep's milk.

The stock farm has continued activities, and has been extended by the addition of a poultry unit. It is noted that butter made from sheep's milk is now offered for sale. The Chief Veterinary Officer has also assumed the duties of cereals controller, and undertaken duties in connexion with the organization for the purchasing of essential agricultural commodities.—U. F. R.

GOLD COAST. (1944). **Annual report, Department of Agriculture, Northern Territories 1943-44.** pp. 13. Items of veterinary interest pp. 9–11. [fcp] [Typescript]. **1525**

The report covers the progress being made in extending the policy of "mixed farming" among the natives of the Northern Provinces as far as the wartime necessity of increasing the production of food crops allows.

Experiments in fattening young bullocks, fed on locally grown concentrates and fodder, showed that it was possible to produce beef carcasses of excellent quality, said to be comparable to those of Shorthorn bullocks in the United Kingdom.

Sheep at Tamale have much improved in health since they have been regularly treated for helminth infestation and also dipped for flea [*Tunga penetrans* ?] infestation.

Pig diseases mentioned as prevalent at Tamale are ABORTION, PARALYSIS in nursing sows, failure of lactation in sows, and HEAT STROKE. The addition of bone meal to the ration is said to have stopped further cases of paralysis and the addition of red palm oil, as a source of vitamin A, during the dry season, has reduced the number of cases of abortion. Heat stroke is thought to have been due to faults in the construction of the sties.
—J. A. GRIFFITHS.

SIERRA LEONE. (1944). **Annual report of the Department of Agriculture for the year 1942.** pp. 16. Items of veterinary interest pp. 4 & 11–12. Freetown: Govt. Printer. [8vo]. **1526**

Notes are given on the maintenance of stock on the various agricultural stations, and an attempt to develop a pig industry. Losses in pigs occurred from trypanosomes and intestinal parasites, and in fowls from spirochaetes and intestinal parasites, but no information is given as to the species of parasites concerned. A scheme was drawn up for the establishment of a veterinary department to serve both Gambia and Sierra Leone.—U. F. RICHARDSON.

BECHUANALAND PROTECTORATE. (1944). **Veterinary Department annual report 1943.** [HAY, W.] pp. 9. [fcp] [Mimeographed]. **1527**

There were 67 outbreaks of ANTHRAX. PARATYPHOID is said to be widespread among calves, especially in the native areas. BOVINE CONTAGIOUS ABORTION is enzootic. There were 401 outbreaks of BLACKLEG. A Colonial Development Fund grant of £90,000 was obtained for measures to prevent the spread of tsetse fly in Ngamiland. 2,120 animals were treated for TRYPANOSOMIASIS. DOURINE is enzootic, as are RABIES, AFRICAN HORSE SICKNESS, and HEARTWATER.

51,527 cattle, 101,955 sheep and goats and five equines were dipped for TICK ERADICATION. 6,041 cattle, 4,332 sheep and goats, and 100 horses were castrated.

Conditions for the livestock industry were favourable. 42,931 cattle were exported. The livestock census shows approximately 837,000 cattle, 551,000 sheep and goats, and 3,621 pigs. Doses of vaccines issued were—ANTHRAX 689,180, BLACKLEG 83,310, CONTAGIOUS ABORTION 925, PARATYPHOID 13,290 and HORSE SICKNESS 661. The livestock improvement centres have maintained their activities. Seven Afrikander bulls and seven stallions were imported for them from the Union of South Africa, the present policy being to encourage breeding of African types of livestock.—J. A. GRIFFITHS.

I. U.S.A. (1942). **Report of the Chief of the Bureau of Dairy Industry, 1942.** [REED, O. E.] pp. 26. Items of veterinary interest pp. 15–16 & 21–24. Washington, D.C.: U.S. Govt. Printing Office. [8vo] [10 cents]. **1528**

II. U.S.A. (1943). **Report of the Chief of the Bureau of Dairy Industry, Agricultural Research Administration, 1943.** [REED, O. E.] pp. 24. Items of veterinary interest pp. 8, 10–14, 16–17 & 22–23. Washington, D.C.: U.S. Govt. Printing Off. [8vo]. **1529**

Surveys by the Bureau indicate that in 1942 at least 3% (3,500 million lb.) of the potential milk production of the U.S.A. was lost as a result of MASTITIS. The Bureau has tested treatment with a suspension of sulphanilamide and sulphadiazine in oil in its dairy herd at Beltsville. Of 170 cows, 56 examined bacteriologically were shown to be harbouring various mastitis organisms. After infusion nearly 80% of treated animals were apparently clear of infection.

Bulls on diets very low in vitamin A became blind and showed general debility and other signs of AVITAMINOSIS before reproductive function was impaired, indicating that so far as reproductive capacity is concerned, the bull is relatively resistant to low vitamin A intake.

Artificial insemination is now officially recognized as one of the best means of perpetuating and disseminat-

ing the influence of good sires. On January 1st, 1943, there were 405 cooperative breeding associations in operation, with a total membership of 29,429 dairymen, owning or leasing 1,966 bulls. Of these associations 99 were using artificial insemination.

Following the observation that a substance in alfalfa and other plants induces ovulation when injected into experimental animals, preliminary work has centred on improving the methods of extraction, and determining the physiological mode of action of the substance.

Studies of prolactin, the pituitary hormone chiefly responsible for controlling lactation, have resulted in two new methods of assay. Using these methods it has been shown that injection of oestrogens increases the amount of prolactin in the pituitary. It is postulated that this is the mode of action of stilboestrol in inducing lactation.

Large quantities of milk are rejected annually because of flavour defects. Work in this direction has indicated that some of the so-called oxidized flavours develop spontaneously while others develop, for instance, after contact with copper or copper alloy surfaces. In general, milk which is resistant to copper is desirable since it is less likely to develop unwanted flavours. Experiments have shown that neither the amount of carotene nor the feeding of dry rations over long periods cause the spontaneous development of oxidized flavour.

Owing to possible shortage of agar for dairy bacteriology, silica gel has been examined as a substitute. Silica gel is prepared from sodium silicate solutions and preliminary observations indicate that it is likely to be satisfactory. It is cheaper than agar at peace-time prices. Of the diluents commonly used for bull semen, egg-yolk-citrate-gelatin showed the smallest drop in pH on storage for 234 hours, but generally all the egg-yolk media tested were satisfactory when tested over a period of storage of about seven days.—D. D. OGILVIE.

U.S.A. (1942). **Department of Agriculture. Report on the Agricultural Experiment Stations, 19[40]-41.** [JARDINE, J. T., & KNIGHT, H. L.] pp. 128. Washington, D.C.: Supt. Documents. [8vo] [15 cents]. **1530**

Mention is made of the apparatus developed by the Washington Station for the diagnosis of MASTITIS by measuring the degree of electrical conductivity of milk. As the result is known immediately a physical examination can be made at once and samples collected for confirmatory tests. Experiments at the Florida station proved that the house fly is a natural spreader of mastitis by passing from teat to teat and from one animal to another. The Michigan station investigated the therapeutic effect of sulphanilamide in cows affected with the disease: It relieves the symptomatic reaction in acute streptococcal mastitis, the temperature falling and the appetite returning. In chronic cases of streptococcal mastitis treated, the numbers of streptococci in the milk decreased but in all cases returned to the pre-treatment level afterwards. The drug appears to be toxic for cows when given in repeated large doses. The Washington station found that a practical means of dealing with streptococci on the hands of the milkers, and in the droplet of milk at the teat end after milking, is the use of a solution of a commercial soap or soap powder at 40°C. In the presence of 5% each of skim milk and broth culture such a solution was 2–3 times as effective as phenol. Soap solutions in the concentrations usually used in lathering the hands with soap in warm water are effective disinfectants, and may satisfactorily replace other disinfectants for the hands of the milkers and the teats of the cows.

The Washington station found washing soda solution the most practical disinfectant for destroying the causative organism of SWINE ERYSIPELAS (*Erysipelothrix rhusiopathiae*). Tests of other disinfectants are referred to. The Idaho station found that the disease can be controlled by removal of reactors from a herd, disinfection of the navels of newborn pigs, and the avoidance of infected pastures.

SEPTIC PNEUMONIA of calves, associated with NAVEL-ILL and WHITE SCOURS in calves in unsanitary surroundings, is reported by the Florida station.

Tests at the Wisconsin station showed that animals which have ceased to react to the agglutination test for BRUCELLOSIS may safely be placed with non-infected cattle. The duration of immunity to calfhood vaccination with strain 19 of *Br. abortus* was tested at the Indiana station on 13 animals through two gestations. Nine were vaccinated when 4–6 months of age and four were kept as controls. At the first gestation all carried full-time calves, but two calves of the control animals were born dead. Following exposure in the fifth and sixth months of the second pregnancy, all the controls aborted and of those vaccinated, three had premature living calves and the other six, full-term living calves. *Br. abortus* was recovered from the three with premature calves. The principal source of infection of herds once cleared was found by the Connecticut station to be from reintroduced infection. Five horses, positive reactors to the agglutination test, were found at the Minnesota station to excrete the organism in their faeces; this source of infection for cattle is discussed.

During eight years' observation at the Utah Station, a great deal of loss of production, both temporary and permanent, has been experienced through sterility in heifers and cows from infection by *Trichomonas foetus*. The uterus is the primary site of infection. In a three-year period, 18 females and two bulls were found infected and ten of the females made complete recoveries.

The Kansas station isolated the virus of EQUINE ENCEPHALOMYELITIS from a blood-sucking cone-nose bug [Triatomidae] that occurs commonly over much of the region where the disease has appeared and is known to feed upon horses. This was said to be the first known evidence of the virus in a blood-sucking insect in nature. SWINE FEVER was not transmitted to susceptible in-contacts by pigs treated with crystal-violet vaccine. Immunity tests made 30 days after vaccination were usually satisfactory but it was less uniformly useful 2–3 months after vaccination. It is considered that crystal-violet vaccine offers a suitable means of eradicating the disease, as it avoids the use of a live virus. The North Dakota station found that anaemic piglets of sows immune to S.F. do not lose their immunity to S.F. as a result of the anaemia.

The Louisiana station observed immunity in three calves to a mixed infection with nodular worms [*Oesophagostomum*] and hookworms [*Bunostomum*], induced by a previous infestation, and in another calf to a pure infection of nodular worms. Resistance is apparently not permanent as one of the calves became infected after 5 months. The Hawaii station found that the caecal fluke of poultry, *Postharmostomum gallinum*, is common where the snails *Eulota similaris* and *Subulina octoma* occur.

Experiments at the Hawaii station on means for combating liver fluke in cattle through control of the snail host *Fossaria ollula* showed the value of those recommended in Great Britain, *i.e.* drainage and, where convenient, application of copper sulphate to pastures and streams. Distol and kamala were effective in treating infested cattle. Phenothiazine given as a powder in

the food of horses gave very satisfactory results in removing strongyles from adults and *Trichostrongylus axei* from colts, but was ineffective in removing *Parascaris equorum* and *Gastrophilus* spp. At the Kentucky station when a number of horses were treated with 950 ml. doses of a " mixture of oil of chenopodium, spirits of turpentine, and linseed and mineral oil ", two died, and it is suggested that damage to the intestinal tract allowed paratyphoid organisms to initiate a systemic infection. Phenothiazine given to lambs at the rate of 0·5 g. per lb. body weight in a solution consisting of 10 g. phenothiazine, 0·5 g. powdered gum acacia, and 30 ml. water, reduced the egg counts of stomach and nodular worms to a harmless level in all cases. The Washington station found phenothiazine to be effective for poultry caecal worms [*Heterakis gallinae*], 95–100% being expelled.

Vitamin B_1 requirements of rats increased when they were exercised ; with no vitamin B_1 in the diet, food consumption and rate of growth were reduced and the deficient rats became progressively less active. In vitamin A experiments in cattle, the time required to deplete animals varied with age and size ; night blindness developed in about 56 days in calves 3–6 months of age, whereas in animals 16 months old 178 days were required. Normal reproduction of dairy cattle was generally impaired if the average daily carotene intake in the last 90 days of pregnancy fell below 40 μg. per lb. body weight. A further reduction caused symptoms of vitamin A deficiency in the dam. Plasma carotene values of less than 100 μg. per ml. in calves and 150 μg. in pregnant cows were found to precede vitamin A deficiency. Low vitamin A content has been noted in the milk of cows limited to dry winter feeds but access to winter pasture crops such as rye or clovers more than trebled the vitamin A content of the milk from such animals. The following vitamins were found to be synthesized in the rumen of cattle and sheep—thiamine and pantothenic acid at the California station ; riboflavin, pyridoxine, and vitamin K in cattle at the Texas station ; riboflavin in beef cattle at the Ohio station ; and thiamine, riboflavin, nicotinic acid, pantothenic acid, pyridoxine, and biotin in heifer calves, at the Wisconsin station. The riboflavin content of milk is influenced only to a very limited extent by the diet.

Goats on a diet inadequate for normal reproduction and lactation had only two-thirds of the normal amount of ascorbic acid in the blood. Ascorbic acid was shown at the Wisconsin station to have a close relationship to reproduction in cattle, and it has been used beneficially in poor breeders, both male and female. Excessive amounts of ascorbic acid in the semen were, however, often associated with unreliable breeding records. There is some evidence that the cow can synthesize vitamin C, but ingested ascorbic acid was rapidly destroyed in the bovine rumen and feeding massive doses did not increase this factor in the blood or milk and only slightly in the urine. Injection of ascorbic acid does however increase the amount found in the blood, milk, and urine. Mastitis infection decreases the ascorbic acid in the milk. The ascorbic acid content of blood and milk is apparently closely dependent on the diet.

The South Dakota station showed that cows maintained on a vitamin D deficient ration with no sunshine developed avitaminosis D. When Ca and P were added to the ration there was no effect, but cures were effected when 2 lb. of alfalfa daily were added. The Arizona station found that cows in conditions of sunshine produced milk practically twice as potent in vitamin D as those kept in dark stalls.

For poultry, yellow carrots were found to provide a good source of carotene as a substitute for green feed. It was found that there was no advantage in adding wheat-germ oil to a well balanced ration, and giving large amounts of nicotinic acid had a toxic effect. A dermatitis more severe than that caused by pantothenic acid deficiency was described by the Wisconsin station. Riboflavin was found to prevent " curled-toe paralysis " and to increase growth rate.

In work on sex control at the Illinois, Texas and Wisconsin stations, modification of the acidity of the vagina prior to breeding was proved experimentally to have no effect on the sex of the offspring.

Sheep fed lead arsenate died after receiving approximately 1·5 g. The amounts of arsenic and lead remaining on apples as spray residue were relatively non-toxic to pigs.

Nolina texana (buds and blooms) was found by the Texas station to be toxic for cattle, sheep, and goats. When the amount consumed was equivalent to 1% of the body weight, sheep and goats became sick and usually died. If only dry feed was available at the time, degeneration of the liver cells occurred, accompanied by obstruction of the bile duct. If some green food was consumed at the same time the animals also became photosensitive, and if they were exposed to the rays of the sun, itching of the skin developed with swelling of the skin and subcutaneous tissues of the head and the ears.—J. A. Griffiths.

Reports of Agricultural Experiment Stations, U.S.A. [Details of the titles of these reports and of relevant papers contained in them will be found in *Index Veterinarius*]. **1531**

Delaware, 1940–41.

In work on Rocky Mountain Spotted Fever rodent trapping was carried out to ascertain the host relationships of the immature forms of *Dermacentor variabilis*. The meadow mouse, *Microtus* sp., is a common host. Other rodents had very few of these ticks. Adult *D. variabilis* infested three dogs continuously from April 29th to August 23rd. The peak of infection was in May.

Indiana, 1940–41.

In a study of the prevention and control of Mastitis the udder of each cow was washed before milking with a clean cloth soaked in chlorine solution. The teat cups of the milking machine were rinsed in chlorine solution before the milking of each cow and the teats were also treated after milking. One strain of *Staphylococcus aureus* isolated from a case of mastitis showed comparatively high resistance to chlorine but strains of *Streptococcus agalactiae* showed a low resistance. There was a correlation between the diagnosis based on laboratory tests and that based on the results of clinical examination. [No details are given.]

In tests made for bactericidins for *Salmonella pullorum* in avian blood, a wide variation was found in the individual hens examined. This bactericidal action seems to depend on complement as it is destroyed after heating the serum for 30 min.

When sows reacting to Brucellosis tests were removed from a herd of 200, there was a reduction in new reactors and in the abortion rate.

In a study of the pathogenicity of strain 19 of *Brucella abortus* for mature cattle, five pregnant second-calving cows which were negative to the agglutination test were injected intravenously [dose not stated] with 48-hour cultures of strain 19. All five had positive aggln. reactions at 1 : 25 dilution 72 hours after injection, and on the fifth day all were positive at 1 : 100. The maximum titre was reached 16 days after injection when four had titres of 1 : 2,500 and one of 1 : 250. The

titres had declined after 4 months. At various intervals after injection blood cultures were made but no brucella organisms were isolated. Three of the five cows aborted. From two of the cows which aborted cultures of brucella organisms were obtained. [Whether these were strain 19 or not is not stated.] Two negative pregnant cows each received a conjunctival instillation of one of these cultures. Sixteen days after the instillations one had a titre of 1 : 250 and the other of 1 : 100. [It is not stated whether these two cows aborted.]

Virulent *Br. abortus* organisms were instilled into the conjunctival sac of each of two young bulls. In neither bull did the agglin. titre rise above 1 : 25 following exposure. Neither bull developed a definite brucella infection in the intervals of six and eight months respectively, during which they were kept before slaughter. In a bull which had developed a severe unilateral orchitis after exposure to natural infection with *Br. abortus*, the titre was 1 : 2,500. *Br. abortus* was isolated from the epididymis of the apparently normal testicle but not from the diseased testicle.

After suspension of breeding for three months in a herd infected with *Trichomonas foetus*, most of the cows then served carried full-time calves. Of ten foetuses from eight herds examined, two foetuses from different herds were found to be infected with *Vibrio foetus*.

An outbreak of BOVINE ENCEPHALITIS caused six deaths in a herd of 56 cattle. Two outbreaks at three months' interval occurred in another herd and 20 out of 60 animals died. No salmonella organisms could be demonstrated in spleens with typical haemorrhagic SWINE FEVER infarcts from 127 pigs hyperimmunized with S.F. virus. A single intravenous injection of spleen, kidney, heart, liver, ovary, or nervous tissue from a fowl infected with generalized LYMPHOMATOSIS was followed by an increase in the incidence of lymphomatosis in the injected birds. Chicks given two intraperitoneal injections of material from ten-day-old embryos of eggs laid by a hen affected by IRITIS showed only slightly greater incidence of LEUCOSIS than did the controls.

Autopsies and specimen examinations numbered 3,794 and, of these, 3,349 were on birds. 3,260 PULLORUM tests, 640 BRUCELLA agglutination tests on samples from cattle, and 109 on samples from pigs were made.

In sheep-feeding experiments, no differences were observed when fluorine was excluded from, or added to the ration in amounts up to 6·0 mg. per kg. body weight daily. In rats fed rock phosphate and other minerals of varying F content, as sources of Ca and P, rock phosphate with a high F content depressed growth slightly. No gross abnormalities of the teeth and bones were observed in any of the animals.

The subcutaneous treatment of twin Hereford cows with 15–20 mg. thyroxine on three successive days increased the volume of the milk by 15–35% and the percentage of butter fat as much as 24%. As the maximum milk flow even under treatment was only 8 lb. per day it seems unlikely that thyroxine has any value in beef cattle.

Vitamin A deficiency in calves was suspected as a cause of a severe diarrhoea from which 6 out of 8 died. All the six dams of those that died had low blood carotene values.

In a study of the reproductive organs and semen it was shown that beef bulls tended to produce lower quality semen in the month of August and the greatest concentration of spermatozoa in January. The duration of life of the spermatozoa was least in August and greatest in February, and the percentage of abnormal sperm heads greatest in August and least in January.

Fowl spermatozoa frozen at –76°C. retained their motility for 104 days. Of 48 eggs laid by seven hens inseminated with semen which had been frozen at –76°C., 25% were fertile, but in each case embryonic development ceased after 15 hours. There are no detectable differences in the semen of individual males in the ability to withstand freezing. Spermatozoa stored under anaerobic conditions in sealed capillary tubes lost motility in 2–3 hours. In Barred Plymouth Rock males the minimum output of semen was from July to November inclusive and the maximum during January and March. The concentration of spermatozoa did not vary much but it was greatest in May. The temperature at which males were kept did not affect semen production.

In an experiment on the effects of electric light on the growth of young chicks, results agreed with those obtained in two previous trials, and showed that there is less efficient utilization of feed. Ultra-violet irradiation for four and six hours daily of two lots of chicks on the same ration made no difference in the average weights at 14 weeks of age. After irradiation with an S–4 lamp for four hours daily there was no increase in hatchability in a group of 60 White Leghorn pullets as compared with a second group fed the same ration but not irradiated. In the first group 78% hatched and in the second group 84%.

KENTUCKY, 1941.

Study of *Corynebacterium equi* was continued during the year. Cultures made from the organism recovered from the genital tract of mares, aborted foetuses, foals having pneumonia, and from the submaxillary glands of pigs were all of the same serological group. Of 34 cultures from various sources, 29 were placed by agglutination tests in four serological groups, divisible into at least 19 serologically distinct types.

A liver tissue vaccine is stated to have given promising results against VIRUS ABORTION of mares. Further investigations are in progress.

POULTRY LICE were controlled by the application of 1 oz. 40% nicotine sulphate to each 150 ft. of roost. In tests, 97·6–100% of the lice were killed.

Exposure for periods of a few months to five years of 38 healthy horses, stabled and in paddocks, to contact with 12 horses affected with PERIODIC OPHTHALMIA failed to transmit the disease. In further experiments with 32 of these healthy horses, attempts to transmit the disease by inoculation or through insect vectors also failed.

The ascorbic acid content of the aqueous humour in young horses affected with INCOORDINATION ("WOBBLES") was 58% less than the normal and that of the spinal fluid was 23% less.

"In the study of the epizoological distribution of Salmonella types, 884 cultures were classified of which 604 were isolated from domestic animals and 280 from man. Three new serologic types were recognized and their antigenic constitution determined. These new types and their antigenic formulae were *S. illinois*—(III) (X V) XXXIV : z_{10}–1,5 ; *S. amherstiana*—(VIII) : l(v)–1,6 ; and *S. salinatis* IV XII : d e h–d e nz_{15}. The latter species was transformed into a type indistinguishable from *S. san diego* by growth in immune serum. This is the first instance in which the transformation of Salmonella types has been demonstrated. Two additional undescribed types are now under study. Three species not hitherto recognized in the United States were encountered : *S. rubislaw*, *S. chester* and *S. cerro*. *S. cerro* previously had been recognized only in South America. *S. rubislaw* was recognized in animals for the first time ; and *S. manhattan*, *S. saint paul* and *S. abortus equi* were recognized for the first time among cultures isolated from man. Two cultures isolated from

man were identified as *S. pullorum*, and one was associated with gastro-enteritis. Association of *S. pullorum* with gastro-enteritis of man is significant inasmuch as the bacillus occurs frequently in poultry and eggs. *S. pullorum* also was isolated from ulcerative colitis in a pig. This is the first authentic record of the isolation of *S. pullorum* from man and swine. *S. cholerae suis var. kunzendorf*, which occurs commonly in swine, was isolated from the ovary of a hen."

MASSACHUSETTS, 1940–41.

AVIAN TUBERCULOSIS is rare, only seven cases having been found in five years. *Salmonella typhimurium*, *S. anatum*, and a type which appeared to be new, were isolated from fowls.

In flocks comprising 527,328 birds, 0·09% were reactors to the agglutination test for PULLORUM DISEASE, most of them in one flock.

No permanent change was found in the infective agent of AVIAN ENCEPHALOMYELITIS after 125 intracerebral passages through chicks. After the virus had been stored for 837 days at 10°C., it produced typical symptoms in 50% of chicks inoculated. Nearly 40,000 birds were vaccinated against INFECTIOUS BRONCHITIS during June, July, and August. Of 2,264 specimens examined under the diagnostic service, the main diseases were PULLORUM DISEASE, COCCIDIOSIS, FOWL POX, INFECTIOUS BRONCHITIS, INFECTIOUS LARYNGOTRACHEITIS, TUMOURS, FOWL PARALYSIS, EPIDEMIC TREMOR, kidney disorders, reproductive disorders, RICKETS and deficiency diseases. Helminths identified included *Capillaria contorta* in turkeys and *C. plica* in a fox.

The LYMPHOID TUMOUR experimentally transmitted in chickens has been maintained in serial passage during the past year. Twenty-three different types of tumour were found in the collection of 384 SPONTANEOUS TUMOURS investigated. The commonest were lymphocytoma (55·5%), and 32·8% were of six other types (leiomyoma, embryonal nephroma, myelocytoma, leucosis, epithelioblastoma, and fibrosarcoma); other kinds were carcinosarcoma, neurogenic sarcoma, haemangioma, fibroma, cholangioma, hepatoma, histiocytic sarcoma, myxoma, lymphangioma, thymoma, rhabdomyoma, osteochondrosarcoma, fibrochondrosarcoma, melanoma, mesothelioma, and teratoma.

There are three forms of lymphocytoma—a diffuse, a nodular, and a combined diffuse and nodular form. When the host is non-resistant the growth is diffuse. In the nodular type the host has a great deal of resistance. In the third type there is only moderate resistance.

Feeding manganous sulphate increases the amount of Mn in milk. It was found that laying hens on a ration having as low a content of manganese as 17–24 p.p.m. for 12 lunar months did not develop deficiency symptoms.

MISSISSIPPI, 1939–40.

ROUP caused high mortality in young birds. A group of birds from stock infected with RANGE PARALYSIS reached maturity on infected soil without contracting the disease. Preventive measures recommended are attention to sanitation in brooding, and control of internal parasites, together with "feeding them a milk flush each week to prevent coccidia infection". Experiments are in progress on the value of legumes and common grasses as a source of vitamin A for growing pullets and growing hens.

MISSOURI, 1938–39.

Infected pigs are not considered a serious problem in the control of BRUCELLOSIS of cattle under Missouri pasture conditions. Pigs dosed with live cultures of *Br. suis* and eliminating large numbers of these organisms were grazed on the same pasture as four cows. All four cows had normal gestation periods.

Caecal abligation is claimed to be effective in the control of BLACKHEAD (*Histomonas meleagridis* infection) in turkeys. Eleven birds were abligated and none developed blackhead. Of seventeen controls five developed blackhead.

Of 523 day-old chicks inoculated with blood from 21 chicks hatched from hens affected with FOWL PARALYSIS, 91 developed fowl paralysis. Only 18 birds of the total of 507 in the control group showed paralysis. The number of cases of LEUCOSIS was the same in both groups. It is concluded that leucosis is a separate disease from fowl paralysis.

Details are given of experiments on the vitamin requirements of pigeons. The ration supplied contained all recognized vitamins that pigeons were known to require, but the birds became anaemic and their weights remained subnormal. It was shown that in addition to riboflavin and thiamine the pigeon must have at least three other vitamins of the B complex which could be supplied by adding tiki-tiki, yeast extract, and liver extract.

Rats did not grow to normal weight on simplified diets containing all known vitamins, but if a water extract of liver and yeast was added, growth was normal. The deficiency appeared to be in the water-soluble vitamins and was designated "fourth factor". CATARACT was observed in rats fed on (1) sucrose and no fat, (2) sucrose and 10% lard, (3) starch and no fat, (4) starch and 10% lard, (5) starch and 20% lard, and (6) starch and butter fat. Cataract occurred more frequently when the ration contained fat than when it was absent. Female rats fed on milk with Cu, Fe, I, and Mg added produced as many young per litter as rats fed a normal diet, but there were only half as many litters. It was possible to rear an indefinite number of generations on this diet. Simplified diets containing the known vitamins in soluble form were found adequate for growth of rabbits and g. pigs but were quite inadequate during gestation and lactation. The young died either at birth or shortly afterwards from profuse haemorrhage. An anti-haemorrhagic vitamin was obtained from young growing plants, such as barley. Difficulties in storing the vitamin had not been overcome. Rabbits responded better than g. pigs to this vitamin. Unsuccessful results in rearing chickens on a simplified diet containing all the vitamins in soluble form were found to be due to variation in the method of preparation of the liver extract which formed part of the diet. It was found that a correctly prepared liver extract contained two other vitamins in addition to thiamine, riboflavin, and nicotinic acid. One of these was present in a 95% alcoholic extract prepared at 70°C. and the other in a water extract prepared at 70°C. *in vacuo*.

CHICK ANAEMIA was found to be a deficiency disease, and the anti-anaemia vitamin was not identical with any other then recognized. The erythrocytes of normal and anaemic chicks and blood from the two groups were compared. The r.b.c. of anaemic chicks were more resistant to haemolysis than those of normal chicks. The coagulation time of the anaemic blood was not delayed.

In 196 oestrous periods in mares the mean length was 5·28 days, ranging from 1–37 days. The average duration of 90 oestrous cycles was 20·7 days (10–37 days). Maximum sexual desire occurred 1–2 days before and at the time of ovulation. Oestrus usually terminated 24–48 hours after ovulation. "Split oestrus" (discontinuous heat) occurred in 28 oestrous periods; 31·3% of mares showed the condition. Physiological oestrus (silent heat) was detected in 11

cases. The average time from foaling to first heat was 11·36 days (2–30 days) and the duration of first heat was the same as of subsequent heats. Ovulation occurred in the left ovary in 60% of cases. Involution of the uterine mucosa was seldom complete by the onset of the first heat but was complete by the end of the period. 71·8% of 110 mares bred conceived (73·1% of lactating mares and 70·7% of "dry" females). Of 26 mares bred at first heat after foaling, 50% conceived. 47·4% conceived of 19 maiden mares bred. The percentage of mares which became pregnant after artificial insemination was as follows :– after "split oestrus" 77·8, after physiological oestrus 62·5, and in cases of post-oestrous ovulation 75·0. In 3·8%, twin ovulations occurred.

The injection of 18 cows with 15 mg. of thyroxine on three successive days each month increased milk production by 13·6% and the fat content by 4·75%. This increase of milk and fat production was reached 6–8 days after the injections were commenced. Goats treated when well advanced in lactation showed increases of 69·6% milk and 62·3% fat. Doses given were 12 mg. per day. It is suggested that thyroxine increases production of milk and fat by increasing the rate of metabolism, food consumption, and assimilation. Used continuously in small daily doses, it appeared to cause heart damage.

Investigation showed that the action of the ovarian hormones in causing growth and development of the milk-secreting portion of the udder was through the pituitary body. Apparently oestrogen and progestin from the corpora lutea produced the true secreting lobule-alveolar portion of the udder by action on the anterior pituitary lobe which then stimulated complete udder development. Dairy breeds seemed to have more mammogen in their pituitaries than had beef cattle during all stages of pregnancy, and this was suggested as one of the causes of the differences in milk production. Purified pituitary extracts readily stimulated growth of the milk-secreting portions of the mammary glands of experimental animals, and practical application was anticipated eventually in heifers and goats.

The influence of sulphanilamide was studied on latent cases of MASTITIS in dairy cows with *Streptococcus agalactiae* in the udder. Six cows positive to the bromthymol blue and the Hotis tests were given sulphanilamide in water, 5 g. per 100 lb. live weight daily for 7–14 days. In no case did the udder become entirely free of streptococci and all were positive to the Hotis test at the end of the trial. Another cow with acute mastitis responded immediately to treatment. Udder hardness was reduced, the milk increased in quantity and improved in physical condition, and the cow appeared normal. The milk, however, still contained streptococci and doses of sulphanilamide up to 120 g. daily failed to eliminate the organism.

NEW MEXICO, 1940–41.

BLINDNESS and OEDEMA in dairy animals is being investigated. Vitamin A titrations were made on liver, blood and milk fats of cows and goats. Milk fats from cows being fed hegari fodder plus cottonseed meal rations and kept on pasture showed nearly six times as much vitamin A at the end of the pasture season as cows on a similar ration but without access to pasture. In goats the pasture increased the vitamin A in the milk 3·5 times, and there was slightly more in goat's milk than in cow's milk when both were fed hegari and cottonseed meal supplemented with sudan grass pasture.

RHODE ISLAND, 1940–41.

In infectious CORYZA (*Haemophilus gallinarum* infection) sulphathiazole is effective given in the food in as small a dose as 0·125 g. per oz. of the feed. There is rapid absorption of the drug, reaching a maximum in three hours, and elimination is gradual, extending over 24 hours.

The virus of AVIAN INFECTIOUS BRONCHITIS has been propagated in eggs. The Rhode Island strain is now in its 123rd passage and the B.588 strain of Beaudette in its 157th passage. The virus is fixed in its effect on embryos. Both strains kill most of the embryos within 48 hours. The passaged R.I. strain fails to infect or immunize chicks when they are sprayed in confined spaces. Exposing the flock during the growing period by using a virulent egg-propagated virus is advised as the most practicable method of immunization.

The laboratory carried out 759 P.M. examinations. Diseases mentioned are COCCIDIOSIS, FOWL POX, intestinal parasites, the LEUCOSIS COMPLEX, respiratory lesions and lesions of the reproductive tract.

In poultry feeding experiments one lot of pullets were given buttermilk and a second lot cereal grasses [? green fodder] and juice, both as supplements to an adequate basal ration ; a third lot were given the basal diet only. Hatchability in the first lot was 82·6% of fertile eggs, in the second 86·9% and in the third 79·9%.

SOUTH CAROLINA, 1940–41.

A limited number of calves with INFECTIOUS DIARRHOEA were treated successfully with sulphaguanidine in an initial dose of 5 g. per 100 lb. body weight, a second dose of 4 g. four hours later and a third dose of 3 g. six hours afterwards. If the diarrhoea did not subside a fourth dose of 2·5 g. was given.

In a study of the calcium metabolism of the laying hen, it was found that the hen goes into negative Ca balance during the period following the onset of laying, although supplied with ample Ca in the diet; Ca is removed from the skeletal structure but is replaced later in the period of egg production without any cessation of laying.

WASHINGTON, 1941–42.

The electrometric MASTITIS detector for use on milk has been further investigated. It is claimed to be valuable. *Salmonella pullorum* survives only a short period in moist soil. Mixing infected faeces with soil, or cultivating moist soil during warm weather appeared to be effective means of disinfection. Chick boxes were efficiently disinfected by painting with sodium silicate (water glass).

The SWINE ERYSIPELAS vaccine issued by the Department of Agriculture and a commercial serum were used in S.E. control and no case developed of this disease or of the associated ARTHRITIS.

Feeding a phenothiazine-medicated mash once a fortnight appeared to be of practical value in the control of CAECAL WORMS in poultry. Anthelmintic efficiency appeared to be correlated with the change of phenothiazine into the leuco base of a red dye, brought about by contact with living hepatic cells. The red dye produced by the oxidation of phenothiazine by strong oxidizing agents does not appear to have the same composition.

Pigs consumed without ill-effect a maximum amount of peelings and blossom remains of apples, having residues of previous heavy spraying with lead arsenate.

Early LEUCOSIS diagnosis was aided by differential blood counts, using supravital staining. Interspecies transmission [no details given] with lymphomatous and myeloid leucaemia gave negative results. Milk protein feeding is thought to be useful in prevention.

Extracts of the seeds of tarweed (*Amsinckia intermedia*) caused hepatic cirrhosis in horses, pigs, and

other animals. A chemical investigation of these extracts is in progress.

PEROSIS was produced by deficiency of manganese or choline. The addition of 0·2% choline or 15% liver meal (0·16% choline) prevented choline deficiency while 13% herring meal (0·05% choline) or soybean oil meal (0·09% choline) gave fair protection. 15% pea meal (0·02% choline) gave no protection A large amount of maize in the diet did not increase perosis.

Electric lamps giving light of varying intensity, also ruby red, and red fluorescent light, had no significant effect on egg production of pullets kept in uniformly dark pens, provided the birds received 13 hours of light a day.

Under hot, dry summer conditions (shade temperature 102–108°F.) a "home-made" cooler was tested, situated under the floor of a poultry house 28 × 56 × 7 ft. The cooler was operated by a fan powered by a ⅓ h.p. motor, which delivered 3,300 cu. ft. of air per min. When an uncooled house had a temperature of 100°–106°F. and birds were dying on account of the heat, the temperature in the cooled house was 90°–94°F. Birds in air-conditioned pens had a 2·4% higher egg production.

In experiments on chicks comparing the vitamin D effect of irradiation and of administration of cod liver oil, bone ash analysis showed that irradiation was preferable to the standard reference oil.

WYOMING, 1940–41.

VIBRIONIC ABORTION in ewes was studied. Vaccination with a formolized culture of *Fusiformis necrophorus* was used with apparent success in one outbreak of CALF DIPHTHERIA. By observing the average number of weeks after which CORYZA (ROUP) developed when weekly inoculations of virus were given, it was found possible to select chickens of varying degrees of resistance. When both parents were resistant the average was 6·7 weeks, when both parents were susceptible the average was 4·5 weeks, and if one was resistant and the other susceptible the average was 5·9 weeks. Investigation of chickens artificially infected with LEUCAEMIA or FOWL PARALYSIS showed that the most susceptible period is the first 7–10 weeks of life. Controls protected from direct infection at that stage did not contract the disease.

The parasites of the Wyoming bighorn sheep were found to be identical with those of domestic sheep. The coccidia of sage grouse were harmless to poultry.

Tests show little real deficiency in Ca and P in range cattle in Wyoming. Feeding a ration of wheat straw, beet pulp, and cottonseed which was low in Ca and P had to be continued for two years before any evidence of P deficiency was detected and for three years before marked symptoms were shown. At that stage oestrus was delayed or irregular. Sorghums and millets used as winter feed proved to be deficient in Ca. Feeding bone meal to range cattle reduced calving difficulties.

The poisonous effects were tested of a lichen, *Parmelia molliuscula*, on five sheep and a cow. Two of the sheep were fed 2·25% and 2·7% of their body weight, respectively, in a single day, without harm. A third sheep had 5% of its weight of the plant in five days and was ill by the fifth day. A fourth sheep had 7% of its weight in 14 days without ill-effect. The fifth sheep, which had 4% of its weight in a single day, aborted and developed septic metritis. The cow, which ate 4·5% of its body weight of the plant in 2½ days, developed symptoms but recovered without any treatment. The symptoms were those due to slight irritation of the digestive tract, and some loss of co-ordination of the limbs. Most of the animals recovered unless complications developed. Selenium-bearing plants and soils were found to be more widely distributed than had been recognized. Feeding tests showed that cattle may absorb large quantities of Se in small doses, from eating plants containing Se, without harmful effects. A young heifer had 23·3 g. of selenium salts in a year in small doses and gained weight, without showing any abnormality. She died at the end of the year and 9·3 p.p.m. of Se were found in the hair, 4·3 p.p.m. in the liver, and 2·8 p.p.m. in the blood. There are several species of *Bartsia* including the parasitic "Indian paint brush" (castilleja) that take up Se independently of the host plant.—J. A. GRIFFITHS.

U.S.A. MONTANA. (1943). **Report to the Montana Livestock Sanitary Board, December 1, 1942 to November 30, 1943.** [BUTLER, W. J.] pp. 26. [4to] [Mimeographed]. **1532**

The year was a satisfactory one for the livestock industry.

Four deaths occurred among the 26 cases of EQUINE ENCEPHALOMYELITIS reported. EQUINE INFECTIOUS ANAEMIA (swamp fever) occurs in a few districts.

Of 993 cattle inspected, 100 were infected with MASTITIS. There were eight deaths from ANTHRAX in cattle. The entire State of Montana remains a "modified accredited TUBERCULOSIS free area". Of 31,620 cattle tested with tuberculin, only three reacted. Of 51,149 cattle tested for BRUCELLOSIS 4·7% were infected. No cases of JOHNE'S DISEASE were reported. Eight cases of PIROPLASMOSIS (REDWATER) were reported, and one outbreak of ANAPLASMOSIS occurred. Of 51,067 cattle inspected for SCABIES, 1·56% were infected. PULMONARY EMPHYSEMA (ASTHMA) and PODODERMATITIS (bovine FOOT-ROT) are mentioned as being prevalent in some areas. Isolated cases of BLACKLEG, MALIGNANT OEDEMA, COCCIDIOSIS, INFECTIOUS KERATITIS, and URINARY CALCULI have also been reported.

Bovine PODODERMATITIS and also the FOOT-ROT of sheep were successfully treated with ointments containing sulphapyridine or sulphathiazole.

207,231 pigs were inspected. 459 pigs were found infected with SWINE ERYSIPELAS. SWINE FEVER occurred on 62 premises.

The PULLORUM DISEASE situation in poultry has improved. HELMINTH INFESTATIONS are reported in all livestock.—J. A. GRIFFITHS.

See also absts. **1516** (yearbook, Institute Inspectors Stock, N.S.W.), **1459** (Agricultural Improvement Council, U.S.A.—artificial insemination).

BOOK REVIEWS

GLOYNE, S. R. (1944). **Social aspects of tuberculosis.** pp. 148. London: Faber & Faber, Ltd. [8vo]. **1533**

This book, based on a series of lectures delivered by the author to health visitors, is intended primarily for the student of those social problems which follow in the wake of human tuberculous infections. It is divided into 16 sections in which such aspects as classification, age incidence, portals of entry, decline of the disease, susceptibility and resistance, and the ultimate aims of tuberculous legislation are considered with particular reference to the lessons to be learnt from the past.

The aim of the author is to drive home the need for a sympathetic outlook towards the victims of the

disease and the pressing need for more sanatorium and rehabilitation facilities.

In a book of this type the veterinary aspect is only incidental to the main theme and is adequately covered. It might be suggested that the table on page 25, based on personal investigations by the late Dr. A. S. Griffiths, scarcely presents a true picture of the distribution of the various types of tubercle bacilli found in domesticated animals.—R. E. GLOVER.

BAUER, J. [M.D., Professor of Clinical Medicine, College of Medical Evangelists, Los Angeles, Calif., formerly Professor of Medicine, University of Vienna]. (1944). **Constitution and disease. Applied constitutional pathology.** pp. ix + 208. London: William Heinemann (Medical Books) Ltd. [8vo] [21s.] **1534**

This book is based on lectures given by the author in Vienna between 1923 and 1938 and represents an attempt to acquaint the physician with the principles of "constitutional thinking" at the bedside. The author and his former colleagues in Vienna have made many valuable contributions to the subject and there are more references in the text to their work than to the work of other authors. The book is personal rather than compilatory in nature.

The aspects dealt with include the general significance of constitutional pathology in medicine, constitutional biological inferiority of organs and tissues, integration of constitution with the endocrine and nervous systems, and the classification of constitutional types. Among diseases classed as largely constitutional in origin the author refers to diabetes mellitus, obesity, various disorders of the haemopoietic system (pernicious anaemia, leucaemia, Hodgkin's disease, haemophilia etc.), peptic ulcer, and cancer.

There is a final short chapter on treatment and a bibliography classified according to the chapters of the text.—E. G. WHITE.

FRANK, E. R. [B.S.A., D.V.M., M.S., Professor of Surgery, Kansas State College of Agriculture and Applied Science, Manhattan, Kansas]. (1944). **Veterinary surgery notes.** pp. ii + 237. Minneapolis, Minn.: Burgess Publishing Company. [Revised Edit.] [4to] [$5.00]. **1535**

There is probably no subject in the field of veterinary study where there is such a dearth of text books in the English language as surgery, and for this reason we welcome the publication of this book which is confined to the veterinary surgery of farm animals, particularly horses and cattle. In his preface the author indicates that his book is essentially dogmatic, to serve as a guide to the student until such time as he can develop his own opinion from experience. When supplemented by clinical instruction these notes will be very useful as a background to the training of students, as the author has compressed into small bulk an immense amount of information; at the same time the serious student has been supplied with references to original papers which have appeared in recent years, chiefly in American veterinary journals.

The most striking feature of the book is its copious illustration by excellent reproductions of photographs of animals showing clinical surgical conditions (218 figures). The figures are in close association with the text they are intended to illustrate, but as no direct reference is made in the text to particular figures and the captions of figures are not all self-explanatory, it is not always easy to connect up the two.

The first third of the book deals with surgical technique, anaesthesia, restraint, sutures and suturing, fractures, abscesses, gangrene, sinus, fistula, ulcer, neoplasms and wounds. In this part the author has compressed the text too much; the chapter on anaesthesia includes consideration of restraint, and that on sutures and suturing for fractures also covers abscess, shock, gangrene, sinus, fistula and ulcer. As an introduction for students commencing the study of surgery this is rather unfortunate, as a thorough understanding of the principles of the subject is of greater importance than the factual details of operative surgery. To the graduate with practical experience this will not be such a drawback.

The chapters on regional surgery, which comprise the bulk of the book, are arranged so that the various affections of the organs of the body are grouped together under the following chapter headings: head; neck; front limb; thoracic and abdominal cavities; anus, rectum, vagina and penis; hind limb. Practitioners confronted with a surgical operation will find in these chapters much information that will help them in planning their line of action, though it is only natural that with such a large field to cover some subjects will be found to be more adequately dealt with than others.

The chapter on the affections of the thoracic and abdominal cavities is excellent, covering many surgical conditions, chief among which are rumenotomy, caesarean section in the cow and sow, the various hernias, castration, ovariotomy and the many disabilities of the mammary glands and teats. The closure of the hernial ring in ventral hernia by means of unbleached muslin strips one and a half inches wide does not savour of modern surgical technique, and one is left wondering what the after-treatment of the operation is likely to be. There is some confusion of the text in the last part of the section on ventral hernia, it not being clear whether the author is supplementing what he has already said, or is describing the treatment of another type of case.

The treatment of many of the infective conditions of the feet in the horse might be more informative as to the complications which are liable to develop in the course of treatment and which may lead the unwary into unforeseen difficulties. With reference to wounds of the plantar surface of the foot, the statement "If the examination reveals the presence of pus, open the sole just enough to provide adequate drainage and irrigate the cavity with any efficient antiseptic" appears unsound. Surely, if there is under-run horn anywhere in the foot, the whole cavity should be exposed and a moist antiseptic wet dressing, not a foot bath, is a more rational line of treatment. The prognosis of canker of the foot appears to be altogether too pessimistic, but this is not to be wondered at if the author depends upon the irritant dressings he lists for treatment. On the other hand, the optimistic prognosis about the recovery of extensive "seedy toe" does not concur with the experience of the reviewer, who has almost invariably failed to obtain effectual cure with the formation of healthy laminal horn.

Readers will be able to detect many minor points on which they would like to have further detailed information, but it should be kept in mind that this book does not pretend to be an exhaustive treatise on surgery. The practitioner with limited time for study at his disposal will be duly grateful for the amount of information the author has compressed into small compass. The book should be read by all who interest themselves in surgery.—W. M. MITCHELL.

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